*AMERICAN EDUCATION SERIES*

---

George Drayton Strayer, General Editor

# EDUCATIONAL PSYCHOLOGY

GEORGE W. HARTMANN
TEACHERS COLLEGE, COLUMBIA UNIVERSITY




NEW YORK CINCINNATI CHICAGO
AMERICAN BOOK COMPANY
BOSTON ATLANTA DALLAS SAN FRANCISCO

COPYRIGHT, 1941, BY
AMERICAN BOOK COMPANY

*All rights reserved*

NO PART OF THIS BOOK MAY BE REPRODUCED
IN ANY FORM WITHOUT WRITTEN PERMISSION
OF THE PUBLISHER.

E. P. 1
HARTMANN, EDUCATIONAL PSYCHOLOGY
MADE IN U. S. A.

# *EDITOR'S INTRODUCTION*

Psychology has played a most important role in the development of the art of teaching, particularly during the past forty years. It has become a commonplace to propose that good teaching involves a thorough knowledge of the laws of learning. The advent of experimental psychology led to the undertaking of many researches dealing with specific learning situations. From these studies and from observation of children, certain principles have been developed which are considered basic to the teaching process.

All students of education who have sought to define the goals or purposes for which teaching is undertaken have emphasized the social purposes of education. In an earlier day, importance was attached to the transmission of the social inheritance of the race and of the particular culture which the schools were organized to serve. More recently, emphasis has been given to the demands of the immediate social situation.

The defect of the earlier educational psychology was to be found in the fact that teachers were taught to consider children primarily as individuals having certain intellectual capacities. Learning was described as a process in which the stimulation provided by the teacher or by environmental factors resulted in the fixing of certain habits, knowledges, and attitudes. While some consideration was given to children's interests and emotional responses, the chief concern was not with the whole child but rather with what was considered to be his intellectual capacity.

Even after the science of educational psychology had advanced beyond these earlier stages, emphasis continued to rest upon individual differences and the measurement of achievement and of general intelligence. Learning was still thought of as based upon intel-

lectual ability. More recently psychologists and other students of education have gained a livelier appreciation of the fact that learning does not take place merely because there exists an intelligence or mind. The physical condition of boys and girls, their emotional responses both in school and out of school, all of the environmental factors which impinge upon them have influence upon their growth and development.

It is important to the modern psychologist to stress the possibility of growth and development for all individuals. He is less willing to think in terms of a fixed amount of learning or a limited period in which learning may be accomplished. This new attitude, together with the current strong belief in the importance and even sacredness of human personality, have modified our conception of education.

The Educational Policies Commission, in its monograph entitled "The Purposes of Education in American Democracy," lists as the first major objective that of self-realization. The chief task of teachers is to know children in all of their relationships. The end to be sought is the realization of the most and best that can be developed in the life of each individual.

This book is a most important contribution to the development of educational psychology from the modern point of view. The author stresses the fact that teaching and education are concerned with the welfare of the growing child. He has presented in a most interesting fashion and with a consistency seldom found in the treatment of educational psychology the point of view of those who see in education the responsibility of living and working with boys and girls, youth and adults, in order that all who are given the opportunity may grow into their full stature. Students of education will find the book a most stimulating guide to their study of children and to their growth in appreciation of the teaching process.

GEORGE D. STRAYER

# *FOREWORD*

Warren's *Dictionary of Psychology* defines educational psychology as " the investigation of the psychological problems involved in education, together with the practical application of psychological principles to education." On its face, there is nothing particularly exciting or far-reaching about this straightforward definition. A little reflection, however, will show that (like all definitions) it presupposes some understanding of the nature of education and the nature of psychology.

What makes a problem " psychological " rather than financial, mathematical, geological, historical, or anything else? The claim that psychological factors are present in every situation involving human beings is formally correct; but it is subject to the danger of expanding psychology to embrace more than it can safely contain. Nonetheless this is a better alternative than reducing it to the narrow limits of either introspective analysis or the simpler reactions of the living body. A latitudinarian interpretation of the domain of psychology has the advantage of revealing beneficial relationships with other areas of scholarly and institutional endeavor and increases its personal and social usefulness. *The psychological is any aspect of experience which primarily reflects the influence of either common or distinctive properties of human personalities.* The psychological is roughly equivalent to the *mental* part of life, *i.e.*, those integrating activities of a " self " or organism concerned with the inner and outer forces determining its past, present, and future. Man is an organism like various other biological entities capable of maintaining their existence as independent unitary systems. The psychological is essentially that feature of the life process which appears in the orientation of the living creature

toward environmental phenomena and toward those localized within itself. " I believe," " you count," " he loves," " we vote," " you sing," " they make " — in such pronouns and verbs — especially the latter — is the substance of the specifically psychological to be found. Of course, every act implies an actor, so that every primitive or fundamentally psychological situation is reducible to the base, " man doing something."

Such a view of the psychological compels the psychologist to become occupied with all sorts of concrete objects, circumstances, and physical stimuli to which human beings respond. There is no other way of tracing the dependence of the person's actions upon the nature of the situation in which he is found and of correctly describing his *activities in changing himself and the outer world.* It is at this point that psychology and education begin to make mutually fruitful contacts and that " pedagogical " psychology emerges. Pedagogy, incidentally, cannot rightly be restricted to the art of " leading boys "; it is better viewed as the professionally developed and generalized technique of teaching and learning.

Just as it is necessary to have some adequate conception of the psychological in order to initiate rewarding discourse on this topic, so the precise character of the " educative " factor must be comprehended. It is a mistake to assume that educational psychology is confined solely to the work of a formal community institution known as the school, even though it is historically true that most of its content has been dictated by classroom problems. Education is essentially an instrument whereby society changes itself and its members for the better — or at least in accordance with some objectives considered desirable by those in control, to state the case realistically. Governments are engaged in an increasing amount of educational activity outside the established scholastic channels; churches have never wholly abandoned the many educational functions they once performed; great industries and commercial organizations are seriously concerned with the training of those who work for them, the thinking of those who control them, and the feelings of those who buy from them. Without multi-

plying examples, it is clear that education is attempted by others than teachers or professional educators and that it occurs in many whose status is not clearly that of pupil or student. Indeed, the educational (like the psychological) is *any function of group or individual behavior that emphasizes new and preferred ways of acting, feeling, and thinking, and which involves devices for promoting development toward these ends.*

The obvious kinship, bordering almost upon identity, between the educational and the psychological phases of culturally conditioned experience makes it all but impossible to determine the precise content and boundaries of educational psychology because education and psychology, its dual constituents, both embrace enormous and loosely circumscribed territories of inquiry. Consequently, the problem of meaningful selection becomes acute. The subject matter of educational psychology is certainly not equivalent to that of " things in general," nor is it properly restricted to the difficulties involved in the learning of the content of such courses as appear in the curricula of American public schools in the 1940's, extensive as these are. The choice of the things to go into a text in educational psychology must be governed by some conceptions of what teachers and pupils most need and corresponding ideals of the superior personality and the superior community. No one can prepare a book like this without some notion of the Good Life and the Good Society, both interdependent aims. I have been so much impressed by this fact that the problems of " value " — usually neglected as too esoteric for a concrete discipline — have been made the central theme of this volume. It is paradoxically true, of course, that not everything dealing with questions of " value " is valuable to the reader; but no one can escape the eventual recognition that all choices, decisions, and acts in education are ultimately dependent upon the pattern of values adopted by the participants. A substantial body of material pertaining to this rock-bottom fact is therefore unblushingly offered, despite the lack of precedent for this departure. Throughout only that content has been included which has " made a difference " to me personally and which

my judgment or direct knowledge shows would make a genuine difference in the practice of education.

The literature of educational psychology is cluttered with much obsolete lumber which humanity, if not professional pride, forbids unloading upon the reader merely because the writer happens to be familiar with it and has it conveniently recorded in his files. Old ideas and old experimental findings are certainly not unimportant, but their significance lies mainly in their service as foundational predecessors for later developments. When they are here used, as of course they must be, they are always intended to be instrumental in the establishment of the most valid contemporary viewpoints. No one who knows intimately the arduous labor and intense intellectual effort that has gone into many pedagogical researches can ever scorn productions that have cost so much in human energy. Nevertheless, the merit of an outcome is not inherently proportional to the effort required to create it, as the proverb about mountains laboring to give birth to a mouse plainly implies. But there is another weightier reason why not everything that appears to be grist for one's mill can be ground. If this volume were inspired by the dominant eclectic spirit of American thought and practice, the omnivorous inclusion of varied and often incompatible content might be plausibly defended. Instead, eclecticism both as a method and as a principle is repudiated as intellectually indefensible. *A consistent, coherent, and noncontradictory educational psychology can be achieved only by adhering to a comprehensive theoretical system that does justice to the observed reality.* Such a result is admittedly hard to attain, but unless one makes the attempt, it is even less likely to be realized.

Since about 1930, the thinking of educational psychologists has been noticeably reoriented by the vigorous growth of an allied specialty, social psychology. The reasons for this are easily found in the tremendous cultural upheaval of the past decade and the intensification of strain in almost every phase of group activity. In addition, scientists and intellectuals generally have become increasingly aware of the social functions of science in the modern world. The frustra-

tion of scientific work by forces more powerful than itself is clearly visible in many countries, and the relationship between free inquiry and a democratic form of social organization has become clearer. Educational psychology has responded to this situation by actively furthering studies in the formation of attitudes and delving deeper into the more subtle connections between school and society, particularly as these affect pupil-teacher relationships. Symptomatic of this altered outlook has been not the dethronement of the individual learner, as some have feared, but the sharper location of the individual in his social context. The consequence has been a much more sympathetic appraisal of what is loosely called the progressive or liberal position in curriculum content and instructional method.

An even more fundamental outcome of this decade of re-examination has been a renewal of the will to make practical recommendations in the light of the best expert opinion available rather than trusting to the self-interpreting power of isolated facts to guide the work of those who operate our schools. In other words, educational psychology has now unblushingly begun to place itself at the service of the cause of social reform instead of extending a tradition of remote reserve from the affairs of a harassed populace. That this involves genuine perils cannot be questioned, yet the scientific integrity of the subject is endangered more by indifference to such problems as the effect of membership in an unemployed family upon the school performance of children than by unwillingness to hazard a hypothesis or an indecisive inquiry in this matter. The present text rests in part upon the assumption that *what* educators and psychologists study is as significant as *how* they do it, and that an interest in the welfare of all men is not inconsistent with, but rather a powerful impetus to, the discovery of truth in this and other pursuits.

In addition to this characteristic emphasis upon (1) the *valuational* (in which the master theme of " improvement " is embraced), (2) the theoretical or *systematic*, and (3) the broader *social* features of educational psychology, I have stressed in this presentation (4) the nature of the *creative* act in different skills. There is no reason why educa-

tional psychology would not make its indirect contribution to a new Renaissance in America by equipping teachers and pupils with some of the liberating insights that form its scattered stock in trade. The task of the learner is not complete when he has assimilated old values — that can be claimed only when he has acquired the power to produce new ones. Better poetry, finer music, maturer philosophy, more deeply inspired mechanical and social inventiveness — these are some of the remoter consequences that one may legitimately expect from an educational psychology that succeeds in invigorating the enthusiasms and stirring the imaginations of all concerned with the development of human resources for expression. Certainly this need not be a drab subject cursed by a narrow cobblestone-counting tradition of investigation and limited in its possibilities by the prejudices of parochial intellects. If it has fallen at times into an arid scholasticism, it is largely due to its failure to preserve the vision of those who first gave it its distinctive place in the training of teachers. I am inclined to believe that something of the passion, in part ethical and in part esthetic, that all great leaders of education have displayed, can be transmitted to those who study it through an exposition that is sensitive to these goods. There are some who claim that this is so much irrelevant philosophy or sociology; but for myself I must insist it is the only authentic psychology that I know.

Any author who operates in this territory should ask himself whether the current emphases in education which he finds congenial are really new or merely old ideas clothed in modern garb. The question is probably not as central as many historically minded critics assume it to be, but it serves to focus attention upon the reasons for the persistent vitality of certain notions and the sterility of others. Among the more important current influences which have affected my thinking and writing are: (1) the unity of science movement, (2) the widespread popular demand for a more adequate treatment of the problem of creative expression, (3) the increased preoccupation with theoretical interests discernible among investigators in widely different fields, (4) the ceaseless reverberations of the "social ques-

tion," (5) the numerous efforts to restore the primacy of the teacher, (6) the resurgence of an ethical and religious note in educational discussions, and (7) the approach to human communication represented by the semantics movement. But I have not been satisfied to let these forces play upon me without directing the resources of psychology back upon each of them in turn.

My colleague, Professor George D. Strayer, deserves to be especially mentioned among my many personal obligations, for it was he who first suggested the preparation of this text. His stimulation has led me to define my standpoint as distinctly as possible, encouraged me to include my own researches to a larger degree than modesty usually permits, and kept me moving at points where the going was rough. He has helped me to see better than I ever saw before that the art of teaching is the art of using pertinent concepts from the biological and social sciences for the furtherance of specific educative purposes. My intellectual debt to the great contemporary figures in this area appears on almost every page of this work. I have been genuinely helped in my own teaching by writing this book, and I trust there are also some who will be aided in their professional and personal enterprises by reading it.

GEORGE W. HARTMANN

# *TABLE OF CONTENTS*

## Part One

## *THE PSYCHOLOGICAL APPROACH TO EDUCATIONAL PROBLEMS*


Introduction ..... 3

CHAPTER 1. EDUCATION AS THE FULFILLMENT OF PUPIL NEEDS 7

CHAPTER 2. HOW TEACHERS' VALUES AFFECT THE WORK OF THE SCHOOL ..... 23

CHAPTER 3. THE HUMAN ORGANISM AND ITS EQUIPMENT .... 43

CHAPTER 4. THE LIFE CYCLE ..... 65

CHAPTER 5. THE FIELD OF EDUCATIONAL PSYCHOLOGY ..... 105


## Part Two

## *THE IMPROVEMENT OF THE ORGANISM AND ITS FUNCTIONS*


Introduction ..... 141

CHAPTER 6. INCREASING THE EFFECTIVE INTELLIGENCE LEVEL OF INDIVIDUALS AND GROUPS ..... 145

CHAPTER 7. THE IMPROVEMENT OF PURPOSIVE BEHAVIOR: THE TRANSFORMATION OF MOTIVES ..... 197

CHAPTER 8. THE IMPROVEMENT OF THE EMOTIONAL LIFE .. 225

CHAPTER 9. IMPROVING THINKING AND REASONING ..... 259

CHAPTER 10. INCREASING THE EFFICIENCY OF LEARNING ..... 285

CHAPTER 11. THE DEVELOPMENT OF ORIGINALITY AND CREATIVITY ..... 347

CHAPTER 12. THE IMPROVEMENT OF CHARACTER AND PERSONALITY ..... 377
CHAPTER 13. THE IMPROVEMENT OF SOCIAL BEHAVIOR AND GROUP RELATIONS ..... 409

Part Three

*ADAPTATION OF INSTRUCTION TO DEVELOPMENTAL LEVELS*

Introduction ..... 433
CHAPTER 14. PSYCHOLOGY APPLIED TO PROBLEMS OF ELEMENTARY EDUCATION ..... 437
CHAPTER 15. PSYCHOLOGY OF THE HIGH-SCHOOL SUBJECTS .... 459
CHAPTER 16. PSYCHOLOGICAL ASPECTS OF COLLEGE AND UNIVERSITY INSTRUCTION ..... 481
CHAPTER 17. EDUCATIONAL PSYCHOLOGY AND SOME ASPECTS OF ADULT CITIZENSHIP ..... 503

SUPPLEMENTARY BIBLIOGRAPHY ..... 517

GLOSSARY ..... 527

INDEX ..... 539

# PART ONE

## THE PSYCHOLOGICAL APPROACH TO EDUCATIONAL PROBLEMS

# *INTRODUCTION*

The chapters included in Part I are intended to give the reader a background of ideas that he needs before tackling the core of this work in Part II. They are intended to bridge the gap between a layman's understanding of human conduct and of the institutions of education and the thinking of those who have been intimately identified with these matters. These chapters aim to take the reader from where he now is — presumably in some place of "higher learning" such as a teacher-training institution — and make him more conscious of what is happening to him and his fellows as they study the nature of the universe, man's achievements in the arts and sciences, the operations of contemporary society, and "professional" techniques of the type considered here. In other words, the subject of this discussion is *yourself*. You are *the* organism referred to in these passages which try to relate how you came to be what you *are at the moment* and how you may assist in the process of *changing yourself* into something better.

Prospective teachers are not the only ones who must obey the ancient injunction, "Know thyself," if they are to perform their vocational and other duties efficiently. Self-knowledge is part of the process of knowing others, *i.e.*, comprehension and control of the "me" grow roughly parallel to comprehension and control of the "you." A student of a formal course in educational psychology, regardless of whether or not he intends to engage actively in a school career, is kept in touch with universal problems of self-development and does have the opportunity of increasing the efficiency of his own learning in any area by taking advantage of the hints and "pointers" thereby conveyed. To the future teacher such materials are part of

his regular occupational tools which he can no more do without than a carpenter or a mason can dispense with plumb lines and rulers. They are the instruments by which plans for pupil modification are executed.

The necessity for a return to first principles in educational psychology is emphasized by the finding that 64 per cent of both faculty and student body at a representative teachers college agreed that "students are more interested in getting instructors' opinions, and materials which may appear in tests, than in doing actual thinking." [1] Regardless of whether this does or does not conform to the objective truth of the situation, it is important as an expression of what is believed to be true for those who will staff the public schools of the country. The reasons for this regrettable situation lie deep in the nature of our educational folkways and all participants in its processes share some responsibility for its perpetuation. Whether a shift in emphasis to the meeting of functional needs in the fields of personal, family, and social relationships will correct this admitted ill is as yet undemonstrated, but most educational psychologists are disposed to expect such a result.

In Part I we have outlined the special "system" of thought and action which the rest of the volume seeks to document in greater detail. Insofar as this system can be compressed into a single precept, it could be phrased in the form of the following guide to wise teaching and learning, *viz.: Always consider the whole situation before responding.* Specifically this means such things as (1) not teaching anything about Paraguay without simultaneously clarifying Paraguay's position with respect to its South American neighbors; (2) stressing the essentials of an act and not its "trimmings"; and (3) placing every experience, old or new, into its larger setting. The number of precise illustrations and recommendations is endless; loss of temper, for instance, is to be interpreted as a reaction to an over-

[1] *A College Curriculum Based on Functional Needs of Students — An experiment with the general curriculum at Central State Teachers College, Mount Pleasant, Michigan,* by Kenneth L. Heaton and G. Robert Koopman, Chicago, Ill., University of Chicago Press, 1936.

energized part of a situation in which balance is literally restored by a more even response to the whole field covered by that situation.

A valid theoretical system in any scientific field must be coherent within itself, free of contradictions, and in harmony with the realities revealed by ordinary observation and special experiment. The chief enemy of any intellectual system is not so much a rival system that puts the facts together in a different way but the eclectic tendency of selecting whatever pleases one's fancy from a variety of possible explanations or recommendations. The systematist is impressed with the necessity of making the fragments of his thinking into a whole piece of cloth. The advocate of eclecticism in both belief and overt behavior (to use a different metaphor) deems the best procedure to be a welding together, a fusion in the engineering sense, when the alloy may be stronger than any of the elements of which it is composed. Any system of education or psychology is in danger of forcing certain data to fit an ideational Procrustean bed; and, to mix the figures further, any eclectic product is in danger of being an intellectual "crazy quilt." Unknown temperamental or cultural influences probably determine the satisfactions different persons receive from these contrasted approaches.

The treatment of educational psychology that lies ahead is anti-eclectic in tone because the writer holds that inconsistency is one of the gravest weaknesses of both scholarship and practice at the present time. Many Americans in all walks of life today frequently erect "simultaneous" inconsistency (as distinct from "consecutive" inconsistency which may represent a legitimate revision of a pattern of understanding and doing based on experience) into a positive virtue and thereby make it almost impossible to carry on any discussion intelligently. A vague feeling that the scientific attitude is identical with eclecticism and a quasimystical devotion to the middle-of-the-road solution to everything appear at the bottom of the view that every ambitious effort at integration is suspect in advance and doomed to failure. Yet some system, even if defective in spots, has the merit of creating order out of the unordered world of miscellane-

ous experience. The proportion between " facts " as such and co-ordinating " ideas " must be better balanced than it seems to be at present. The reader should be sympathetic to every system builder even if he remains justly skeptical of the success of his attempt. Such dissent may lead him to form his own system — a distinctly healthy outcome and one of the avowed purposes of a progressive education program.[1]

[1] *Note.* Some of the words already used in this discussion may be unfamiliar. If this is the case, the *Glossary* at the back of this book should be consulted as often as necessary since it is intended to be helpful in just such cases. The ideational content of educational psychology is not hard to any adult with a reasonable command of English. Terminological difficulties usually disappear the further one reads in a volume and thereby builds a contextual background for what is presented. That is why a rereading of any text tends to improve one's grasp of the material. A serviceable mental set to maintain from this point on is to consider the discussion in each chapter or section as a critical commentary on one's own educational history or life career to date.

## Chapter 1

# EDUCATION AS THE FULFILLMENT OF PUPIL NEEDS

There are many different ways of studying the activities that go by the name of education, but there is only one that is truly psychological: the orientation which makes the pupil the very center of the educational universe. The child's nature and needs not only must be *known* to those who work with him in guiding his development, but they must also *govern* the details of the teaching process from beginning to end. Schools do not exist primarily to give teachers jobs, to perpetuate a set of folkways preferred by elders, or to ensure the stability of the state (although they may achieve all these ends); basically they are social arrangements to help children become better adults than they would be without these aids.

Educational psychology, from beginning to end, is concerned with the welfare of the growing child, yet occasionally it can be of most assistance in this respect when it focuses its attention not upon the learner himself but upon his surroundings. His optimal development nonetheless remains the fundamental problem because the setting interests the psychologist not so much for its own sake as for its pertinence to the growth of the child. The important aim implicit throughout is not the efficient production of *any* kind of change in the growing organism, but only such modifications as will eventually be acknowledged by both him and others to be the *most satisfying* that could have been made.

This forces the psychologist at the very beginning of his work to give some attention to the notion of the " good," by which he usually

means good for *what* or good for *whom*. This, too, flows from his attachment to the individual personality. An experience is not a pure good per se — the error of many educators who believe there is some universal virtue in knowing who Miltiades was or what the distinction is between a porism and a theorem — but always a good for some purpose and to some person who holds this purpose. In other words, objects, events, conditions, or qualities are *valuable to the degree that there are organisms who value them*. This does not mean that a psychologically valid education is one which magnifies the subjective at the expense of the more objective aspects of reality; it does mean that the things the school does are to be judged in terms of their effects in the lives of the pupils, and not as phenomena divorced from their human context.

## THE PRIMACY OF THE LEARNER

As soon as one holds that the first and foremost task of education is to promote the true interests of the pupil, one encounters the objection that this institution cannot be operated chiefly for the benefit of just one portion of the population. The demands of others, it is argued, must also be met. In addition to the children's wishes, the desires of parents, teachers, and the citizens of the community make themselves felt in the life of the school.

The argument is perfectly correct. Like all other social institutions, the school ultimately touches more persons than those obviously involved in its daily operation. If such individuals are affected, the democratic postulate as well as the dictates of ordinary consideration and thoughtful statesmanship requires that they be consulted about practices and decisions that in some measure influence their behavior. Historically, adults have usually had less difficulty than children in giving expression to their preferences; only in very recent years did children have any direct hand in the shaping of their own schooling.

However, "the primacy of the learner" does not imply that the legitimate objectives of other groups will be destroyed by subordinat-

ing them to the requirements of the child's nature. In the retail commercial field, the slogan that "the customer is always right" has been adopted and followed with extraordinary financial success. Of course, this does not mean literally what it says, since there are customers who seek to exploit the merchant; operationally, it describes a policy of adjusting all transactions according to the principle that the customer should be given the benefit of every *reasonable* doubt. By deferring to as many customer requests as possible and building the efforts of the personnel about the task of pleasing him, rather than the sales force and the proprietors, an end result was secured which also satisfied the latter. Similarly, enlightened business administrators and managerial executives are in the process of adopting the view, "The worker is always right," not because this is factually so, but because on this basis the employer-employee relations have been improved, morale and productive efficiency were heightened, and much needless industrial friction was reduced — all outcomes in which the stockholders, the general public, as well as the workmen are concerned Truth in human relations, as in other areas, must be determined experimentally, and the findings in these two type situations conform to this test.

**The learner as the center of the educational universe.** Equally, the *proper* application of the maxim, "The pupil is always right," furnishes the best single guide to educational practice in our time. Teachers who act upon this motto do not assume an inferior role before their students or forfeit their leadership in the classroom. They find it greatly to their advantage to acquaint themselves with the facts of pupil behavior in general and with the specific history and intentions of their immediate charges before presenting their program of instruction. Such teachers find that their teaching aims are best achieved when they make their educational work a sequence of self-initiated pupil activities rather than a sequence of dictated acquisitions. By such methods they achieve emancipation and full expression, not only for the youngsters but also for themselves.

The real strength and beauty of this psychological outlook, there-

fore, reside in its power to better the situation for a key group not only without injuring that of associated groups but actually supporting them as well. It is a false interpretation of this notion of pupil control of the learning process which assumes that miseducative rather than educative results will inevitably follow, because it implies that child nature is inherently bad. The purposes of pupils can no more be safely disregarded than a government can constantly block the will of its population. An educational program built upon any other basis than the service of the learner's needs is lacking in its most essential psychological foundation.

## INDIVIDUAL AUTONOMY VERSUS EXTERNAL AUTHORITY

No one can be quite sure that he wholly understands another human being, much less an entire group of persons. Our perceptions are not as clear as we desire and our best insights and explanations have to be kept tentative and revised in the light of later evidence. It is fortunate, therefore, that we can call upon the individuals themselves to assist in explaining their behavior, despite the many dangers of self-deception this may involve. A dentist may know more about the state of a child's teeth than the child himself does, and a psychologist may appreciate better than the pupil the forces which led to an error in his arithmetic problem. But these features rarely touch the innermost core of the pupil's personality and it is only the exceptional guidance worker who is able, under favorable conditions, to define concisely the other's "style of life." We are consequently heavily dependent upon the individual himself for direct evidence and testimony concerning his educationally significant likes and dislikes.

As a rule, a person knows his own values best. To claim otherwise is to hold that someone else knows better what is good for me than I know myself. This may be true on specific points such as medical and legal advice, but even here it holds only because the recommended techniques harmonize with the basic wish to secure health, protection, safety, justice, or some other good. Because a person has lived with

himself more intimately than any outsider ever can, he normally is in the best position to report upon what gives him satisfaction and what fails to do so. The assumption that I know better than someone else what is desirable for him is probably due to a confusion of my wishes for him with his own equally justifiable objectives. The person being guided should know what his counselors (spontaneously or upon request) deem best for him, but wherever possible he ought to be free to accept or reject their recommendations. The right of the individual to make mistakes — unless the damage from them is wholly irreparable — should be maintained at all developmental levels as one of the methods by which higher levels of self-direction are achieved. To deny the school child this measure of control over his own activities is merely to substitute adult errors for juvenile ones and to run the risk of making "mistakes of a higher order" rather than those of a simpler type.

**The issue of authority.** The many intricate problems of teacher and pupil conduct implicit in the viewpoint outlined in the preceding paragraph converge about the critical issue of authority in the classroom. Teaching involves the use of power over other human beings — it is, in an extraordinarily fundamental way, a form of *government* regulating the beliefs and acts of those affected by it. From the perspective of the learner's interests, one may distinguish the following types of control in terms of what they generally do to the person affected by them:

A. Unsatisfactory personality influences:

1. The authority of *dominance* (physical or temperamental). Control here is exerted by taking advantage of the submissiveness or docility of the other who refuses to contest the claim.

2. The authority of *power*, status or position. "As teacher, I am boss in this class. You must do as I say."

3. The authority of *affection* or respect. "You should do this because it pleases me. If I deserve your liking, I can claim your obedience."

4. The authority of *fear*. "If you don't want to flunk out, you had better do this."

5. The authority of *expertness* or superior wisdom. "You know less about this than I do; you will benefit by following my advice."

The critical reader may wonder why this fifth type is listed as an undesirable form of authority. The problem is not made easier by the disconcerting fact that experts differ concerning the way in which expert opinions should be received by nonexperts! Recognizing and identifying experts in many areas is a far from easy task. In spite of the tendency of some educational psychologists to encourage *complete* submission to expert judgment and guidance, the long-run effects upon personality are probably debilitating.

Intellectual subserviency can hardly be a true good, however comforting such behavior may be to the "despot."

*B*. Satisfactory personality influences:

1. The authority of the *situation*. This perhaps is most easily revealed in the behavior of an automobile driver who swerves out of the path of an obstacle. His authority for so doing lies in the immediate perceptual configuration. This is a direct kind of authority derived from the contours of the field itself. It blends into

2. The authority of *probable consequences*. Here a student is given freedom to choose and make his own decisions in the light of presumptive alternative values. Mature guidance and counseling encourage making available all the possible information necessary to an intelligent "act of will," but properly insist that acceptance or rejection be the task of the student alone. This is cause-and-effect authority; sensitivity to natural consequences is the ruling factor.

Broadly speaking, the *A* types of authority as used and encouraged by teachers harm the personality and make for miseducative results in the long run, however much they may seem to solve the immediate emergency that gave rise to them; the *B* types, on the other hand, while mildly idealistic in content, have a personality-building attribute and seem to be the only forms appropriate to independent learning. Obviously such responses as reflective thinking, critical examination, and objectivity of attitude are far more likely to be developed by the latter procedure than by the former.[1]

[1] Modified from G. W. Hartmann, The Relation of Learning Activities in College to the Development of Personality, in *The Study of College Instruction*, 27th Yearbook of The National Society of College Teachers of Education, Chicago, Ill., University of Chicago Press, 1939, pp. 104–105.

## THE WORLD AS SEEN BY THE GROWING ORGANISM

As soon as it seems reasonable to build one's educational program upon the specific needs of the human beings most intimately affected by it, it becomes necessary to acquaint oneself with these needs. No sustained group activity such as school instruction can be performed effectively without some inventory or catalogue of the requirements of the patrons which it is specifically designed to meet. Possession of such a list does not alone guarantee pupil satisfaction, but it is the first step toward rearranging situations so that this result ensues.

How does one discover what children want? Usually by two methods: (1) asking them, and (2) watching them. The efficiency of both of these simple procedures, however, is greatly increased if the observer is able to place himself in the respondent's position and to experience as directly as possible the original deficiencies which led to the expression of a certain want. For example, a very small child lives in a visual world the dimensions of which are subjectively different from those of an adult. As a creature of barely 30 inches in height, he looks *up* at many of the levels and surfaces at which attracting things are going on. A motion-picture record of the environment taken from the eye level of a child (say 2 feet above the floor) produces a perspective giving the impression of one living among giants. The near views are of course much more distorted than the far ones. It is probably not too fanciful to hold that a sense of appealing strangeness characterizes the younger child's mood as he reacts to the objects and events of what is literally a "larger" adult world. Scaling down the things he uses so that they are within his grasp (manually and intellectually) is clearly one way of meeting this inarticulate demand for an environment that is *manageable*. Grade placement and adaptation of stimuli to the learner's developmental stage flow from this basic consideration.

**Penetrating the inner life of the young.** The significance of the factor of sheer size in coloring the outlook of the growing organism is emphasized again during the adolescent years. In most cases it takes

until a child's tenth birthday before his stature begins to approximate that of an adult. Before then an increase of 1 inch in height, while noticeable, does not create the same effect upon parents or other adults as does the same gain thereafter. The reason seems to be that an inch of elevation at the observer's head or face level is much more impressive than a corresponding change with the child at hip level. The effect upon the adult is clear enough; its effect upon the adolescent is inevitably that of making him feel "grown up" because at long last he is able to view the world from the same physical plane as do the others. A teacher of the younger children must feel his way toward this recognition before he senses that there is a vague but nonetheless real need for a youngster to reach his maximum in certain obvious aspects of growth. This is clearer on the physical than on the purely intellectual side; but without some counterpart to serve as a natural goal in the latter realm, the task of instruction would be much harder than it is.

To remain a stranger to the inner life of the school child is to deprive oneself of one of the best means of fostering his development. Unless one knows what children want, what assurance has one that the things which the school offers them have either meaning or value in their lives? The evidence at hand indicates that children's judgments are of genuine usefulness in the work of the classroom and that their opinions on matters pertaining to their own welfare frequently coincide with the views of specialists. Thus, one famous demonstration school when faced with an obsolescent plant made a professional survey which listed as one of its chief deficiencies inadequate play space. For some time before this report, every class from the first grade to the high-school graduating group had mentioned this item as the major limitation of an otherwise very fine institution. Pupil participation in school policy is not an invitation to the destruction of every educational value, but an indispensable means of ensuring the preservation and attainment of the truly satisfying.

## DETERMINING EDUCATIONAL NEEDS

If a psychologically defensible education is one which concentrates its energies upon the individual learner and if the learner is best viewed in the light of his characteristic needs, then these needs become the principal directive forces in the educative process. Because this concept of need is central to all modern versions of institutional behavior, some sharper outline of the issues it raises must be given.

A need may range all the way from the desire to shift one's bodily posture after sitting too long in one place to a desire to know the topography of that other, dark side of the moon which no human eye has seen. The first type of need has a simple biological basis and is universal; the second is a subtler, culturally conditioned need since most earth dwellers do not know that we never see more than the same four-sevenths of the lunar surface because its rotation speed relative to the earth's is such that the same "face" or side remains presented to our planet. This latter need is a very elaborate manifestation of "curiosity" and could not appear except in personalities exposed to a great deal of preceding stimulation.

At its simplest, a need is any condition of the body tissues that produces seeking or "adient" behavior (to use a term of Holt's). Thirst, hunger, elimination, and sex needs are clear instances of this type. Certain of these tissue needs require that something be brought into the body, and others require the expulsion of some organic substances. Much of educational effort, in school and out, centers around the regulation and control of these needs which are inherent in the organism because of its physiological constitution.

**Deprivation as the basis of need.** The experience of a need is most clearly aroused when there is some lack. A child who shivers because he is not warmly dressed or adequately fed in winter is suffering as a result of the absence of these factors or conditions. Supplying him with them is not, strictly speaking, an educational function, but rather a precondition to effective educational effort; however, a certain type of community instruction may be involved in creating this precondi-

tion. Insufficient and inadequate food has been, and remains, the lot of most of mankind, and the correction of this condition is a teaching and learning project of colossal magnitude.

A need and a want may be considered synonymous for most educational endeavor, although some discussions of this topic have introduced a variety of doubtful distinctions. A want is an *awareness* of some lack, usually associated with an unpleasant feeling tone; it implies a recognition that the presence of the missing element would further the life activities of the organism by making it more comfortable or by improving its adjustment to the environment. Some writers think of a want as a need of which the person is clearly conscious, *i.e.*, a *felt* need, and reserve the term "need" for any deficiency which if supplied would result in a better adapted creature. Thus, a student may really need to know more about fascism and communism if he is to be equipped for intelligent response to civic affairs; but he may have no true want for such information on the ground that politics does not interest him.

**Transformations and conflicts among needs.** This raises the question of the evolution of needs. Some needs, especially those of the simpler organic sort, remain more or less stable throughout life, whereas others drop out with passing years (such as the need for vigorous physical exercise), and still others are added (such as the desire for eminence in one's work or in the life of the community). This fact greatly complicates the functions of the school. It has a difficult enough job at best meeting the fundamental or already operative needs of pupils; yet its work also demands that it create needs (or wants) where none existed earlier. This it can do only by building upon the foundations of previously established needs. A need for accuracy in computation is not as "original" or primitive as the need for the social approval of one's "peers," but the former specific one may be created or differentiated out of the latter more generalized and diffuse want. *This change in the pattern of needs with passing years or special circumstances is the underlying dynamic factor in all education.*

One of the most puzzling consequences of erecting all teaching and learning procedures upon the need principle is presented by the existence of certain needs whose unrestrained expression clashes with the needs of others. Concretely, " respect for personality " means that an individual's needs should be met so long as they do not conflict with the purposes of other personalities. The emperor Caligula is said to have had an imperious " need " to chop off the heads of his fellow Romans, but expression of this sort for him plainly meant gross suppression for others. The need of one group of humans for " peace " is antagonistic to another group's need for " justice," a need that may make the latter willing to fight. In the life of the school, this predicament is seen in the need of some pupils to be constantly in the positions of leadership, a situation which may be injurious to the best development of their classmates. In such cases, the conflict is most satisfactorily resolved by the subordination of the lower need to the higher. Which need is primary and which secondary in any given case must be determined by a careful weighting of each in the light of the most *inclusive* and *lasting* purposes of both the individual and the group. Wherever needs battle with each other, the highest need is the one that best triumphs not by fully suppressing or frustrating the lesser need but by assimilating and integrating the energies of the lower want to itself. A pupil's need to play with his companions conflicts with his desire to finish his homework for tomorrow's class. If he can view the situation in such a fashion that it seems clear that both he and his fellows will feel more comfortable if the project is completed before playing, then a rational or intelligent organization of his needs into an appropriate time order will have been achieved. In any case, there is something like a derived or " higher order " need to solve any actual clash of needs that arises within the organism and which motivates the educational process in dealing with just such situations. Unless our development is cut short, we all come eventually to recognize a comprehensive " want to regulate wants " and the necessity for satisfying this major " organizing " demand as well as the lesser specific wants that it marshals.

## SCALES OF VALUE AND THE PROBLEM OF MEASUREMENT

*Is there an empirically verifiable or objective hierarchy of values?* This somewhat forbidding question may be the most important single problem confronting educators at the present time. If the preferences on which we build our lives are merely lawless whimsies, then educational psychology is no more than a long-winded rationalization of discrete and powerful elementary appetities. But this does not seem reasonable since the maturing organism has an over-all need to regulate its own more specific and focalized needs. "Future" needs that bitter experience eventually shows us appear to clash with more urgent "immediate" needs. Which *should* receive priority? We know that near motives usually *do* triumph over remote ones — but *ought* this occur? Is there any promising procedure by which one choice between rival values can be promoted as the more rational and another choice discarded as the less rational? Or is this a hopeless will-o'-the-wisp — one of those unanswerable questions that should never be put to thoughtful men who rightly concern themselves with the answerable only?

This issue, of course, is common to all applied science when it reflects upon its purposes. Bridge engineers choose *a posteriori* between different types of construction, and partially the basis of choice is the relative safety that the various methods ensure. Physicians appraise and use drugs and operative techniques in the light of an intention to cure the patient. Psychologists, at least in the "practical" fields, test their devices and recommendations in accordance with some standards of well-being for their clients. Presumably the more tangled area of educational policy should be amenable to similar treatment.

What is the earmark of a higher value as distinguished from a lower? Is a higher good merely one that is held by more people at any given time? If this is the *sole* standard, then clearly the teachers must be supporting a lower value since they are far outnumbered by pupils! But a value that is held by a majority (usually only a majority

within a certain culture "belt") is not necessarily or inherently a greater value than one held by a minority — it may simply be a better distributed one. The *spread* of a value is not an unimportant test of its own worth, but it needs to be reinforced by other criteria. The scale value (or validity) of any specific value appears to be measured by reference to some larger and more comprehensive (both spatially and temporally) value that encloses the smaller one much as the genus embraces the species. We may call this, in Whitehead's sense, an "organismic" criterion of axiological experiences.

**Determining the comparative importance of actions.** It may be objected that this hypothesis — *i.e.*, that a *higher* value is a *larger* value — is sheer circularity of thinking and that changing the dimensional adjective is merely a case of $A = A$. This difficulty, however, is more apparent than real. Individual values lose their strictly private character whenever they have social consequences, as most of them do, but the individual and the group are faced with the common "mensuration" problem of determining value differences. As a first approximation to greater "accuracy" in our value scales, we may tentatively adhere to the basic criterion that a good that moves toward a universal involving all people as an upper limit is higher than one that approaches a particular as a lower limit. From this fundamental theorem, eight corollary criteria may be derived:

1. *Inclusiveness.* A value that affects *all* men rather than *some* is, other things being equal, superior.
2. *Permanence.* A value that lasts is higher than an ephemeral one.
3. *Irrevocability or Uniqueness.* A value that is not replaceable or readily created by human effort is higher than one that can be produced easily.
4. *Congruency.* A value that harmonizes with one's total pattern of beliefs is superior to one that is inconsistent with the entire structure of integrated behavior.
5. *Cognitive completeness.* A value that is based on full information and broad experience is higher than one resting on partial and fragmentary knowledge.

6. *Survival.* A value that conduces to the maintenance of the individual or the human race is superior to one that leads to the extinction of either.

7. *Urgency.* A value that requires prompt action to be maintained or realized is more compelling than one whose achievement may safely be deferred or postponed until the pressure of the moment has been removed.

8. *Intensity.* A value that is felt more keenly or experienced more deeply than another is the greater, other things being equal.

These eight tests of relative value can be applied to simple choice situations involving only two alternatives by following the standard pattern of the paired comparison technique; *i.e.*, first comparing need *A* with need *B* and then comparing need *B* with need *A* (if the order of presentation makes any difference). It does not seem unreasonable to claim that these criteria may be used with *all* conceivable values by any teachers and pupils capable of understanding these rudimentary concepts.

## SUMMARY

In the foregoing chapter, the viewpoint is presented that educational psychology is essentially the scientific advocate of the pupil's interests. Every learner has certain combinations of needs or "values" to which all teaching procedures must be adjusted. Instruction that does not meet the child's needs is so much wasted effort on the part of those engaged therein. The actual needs that a learner has cannot be safely imputed to him — they must be stated and confirmed by him directly. Those who stand in a position of authority over school children cannot exercise such power without due regard to those forms of immanent authority which are psychologically valid and educationally effective, *viz.*, the control of the immediate objective situation and the sanctions or restraints imposed by the probable consequences of behavior. The needs of the learner grow out of his organic constitution and out of the cultural influences that he assimilates as he develops. These needs vary with the time, place, age, con-

dition, and other factors in the organism's life, but in every case they provide the power that makes learning possible. *A creature devoid of needs is immune to education.* All human wants must be positively rather than negatively appraised by the educator, because even where one wishes to modify them they constitute the energy base which makes their own transformation possible. The fact that needs frequently conflict does not make them an unstable foundation for learning — if anything, this facilitates optimal adjustment. No matter where one turns, the elemental fact of human needs is inescapable. All deliberate modifications of pupil behavior must begin at this point.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Make a list of six or more major needs that you recognize in yourself at the present moment. State them in the simplest possible terms. Do the same for someone considerably younger than yourself with whom you are fairly well acquainted, and also for some much older person. Compare the three lists. To what do you attribute the likenesses and differences that you observe in them?
2. Does the education you have so far received equip you to meet your existing personal needs better than you could without such schooling? Specify the nature of the help that you can trace directly and exclusively to it.
3. Are you able to regulate the quality or intensity of any of your special needs by reference to some larger "governing" need? State as exactly as you can how this seems to occur.
4. How do needs arise in the life of the school child? Which ones appear to be relatively constant and which are subject to change?
5. Comment critically upon this statement: "No teacher is psychologically equipped for his work unless he himself has a need to use some of his energies to aid in satisfying the needs of his learners."
6. What happens to any social arrangement that persistently fails to satisfy the fundamental needs of the people affected by it? What happens to these people?
7. Name a few of the difficulties that appear whenever power or

authority are exercised. What may authority do to the person who wields it? What does power do to those who are subjected to it?

8. Are you usually aware of the inconsistencies and contradictions in your own views? Why? Can a valid system of thought contain any incompatible or incongruous features?
9. Show by reference to at least three varied illustrations how your understanding and control of a small or restricted problem has been improved by seeing this problem in some bigger setting that contains it.
10. Do you find yourself engaged in more and harder thinking while answering these questions than in reading this chapter? Why?

## *Chapter 2*

# *HOW TEACHERS' VALUES AFFECT THE WORK OF THE SCHOOL*

It used to be thought that educational psychology was exhausted in the minute description of pupil behavior, but fuller study of the classroom situation has revealed the equal importance of what may be called the "psychology of the teacher." In pursuing educational goals the teacher is not just reacting to the learners in his care — he is clearly affecting them and much of their conduct is a form of response to his own peculiarities. This means that the normal educational situation is a *social* interaction of two or more persons, in which the mutual give-and-take of ideas and other stimuli takes place according to certain relationships existing between the two poles of this process.

All teachers have at some time been pupils with respect to other teachers, and they are therefore familiar in at least a formal way with the experiences characteristic of both groups. In other words, teachers know what it is like to be pupils (even though their memories of this state may have faded and their sympathies weakened), but pupils must trust to a dimmer intuition as to what it means to be a teacher. This basic fact establishes a power relationship in which the teacher is typically in a position of greater influence than the pupil. Lines of force emerge from the personalities of both; their characteristic proportions are represented in Figure 1.

This standardized relationship, while almost certainly a correct portrayal of the customary state of affairs, is neither inevitable nor altogether desirable from either the teacher's or the pupil's viewpoint,

or from the standpoint of the most efficient learning. One of the teacher's tasks is to facilitate the growth of the child so that he comes in time to cope on more equal terms with his human and physical environment rather than remaining in a position of permanent inferiority thereto with which he originally starts. There are unques-

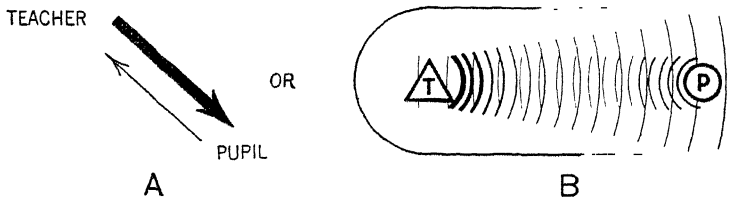



FIGURE 1

Two possible ways of portraying the usual pupil-teacher constellation. Drawing *A* shows the teacher on a "higher" plane exerting more pressure or stimulation upon the pupil than the pupil can place upon the teacher; this gradient difference is not a necessary, but more likely a normal, condition of school life. Drawing *B* (modified from Lewin's topological method) shows both the teacher (*T*) and the pupil (*P*) in the same "field," represented by the closed "ellipse"; the heavy lines radiating from *T* strongly embrace *P*, from which source relatively weaker emanations (the thin lines) emerge.

tionably genuine satisfactions that accrue to a teacher who is able to dominate over students, but as satisfactions they are probably lower than those which arise out of a "parity of the different" where only natural factors making for group leadership are operative. A teacher's needs must no more be frustrated than a child's; wherever it happens that the gain of one person is bought at the price of the loss of another, something grossly defective in the organization of human relations must be corrected.

## THE MOTIVES OR "VALUES" OF TEACHERS

Behind every act of a person lies some other act or event which is not only historically antecedent to it but linked to it in some way as part of a causal system. We may assume that teachers are teachers rather than farmers, tinsmiths, dentists, or lawyers because the special circumstances of their living and the particular demands of their own natures have thrust them into this occupation and not into others.

No one single factor conditions this outcome. Psychologists have found it necessary to protest against the common assumption that the motives of men are few and simple, for all of their recent inquiries support the view that motivation is complex and many-sided. A teacher is not a teacher because of his inability to cope with the rough and tumble business world or because of disappointed marriage hopes. This explanation does not account for the selection of teaching rather than nursing or social work as the next preferred activity. *Opportunity* as provided by the existing form of economic organization as well as *desire* must be present. Every person's occupational destiny is a function not only of his own wishes and the character of physical and social reality, but of the mingled wishes of others as these have expressed themselves in institutions supplying certain goods or services.

One illuminating approach to the problem of motivation among teachers is found in the suggestive system of personality interpretation developed by Eduard Spranger, the distinguished German educational theorist. He holds that every person is best characterized by the things he considers most precious. If we know the nature of the experiences which give a person his highest delight, then our understanding of him is greatest if we think of him in terms of his highest "value." Spranger believes that there are six fundamental personality types which result from this type of analysis:

1. The *theoretical,* that is, the individual who finds his greatest satisfaction in truth or a knowledge of existential reality. In a teacher this is manifested by a disposition to consider facts, information, "understanding" of principles, accurate acquaintance with phenomena, etc., as the most significant good in educational experience. This does not mean that the teacher is insensitive to other human values — it merely reports his belief (and behavior conforming thereto) that the theoretical good belongs at the top of the list for him. Such a teacher tends to be well informed not only about his own "area" but also about other spheres of scholarship or human interest. He is hospitable to all forms of research and in the extreme case endorses

the motto, "Truth for truth's sake," or "Knowledge is its own reward." All other educational objectives are subordinated to this goal which serves as a final good. Under the current form of educational organization, a teacher in whom this value is dominant is encountered with greater frequency at the college or university level than in the elementary school. This value is for him the leading professional motive: Colleagues, students, and people in general are esteemed roughly in proportion to the degree that they embody the theoretical value, and most of his occupational energies are directed toward making it triumph. Ignorance, stupidity, and deception are the ills he abhors most.[1]

2. The *esthetic*, that is, the person whose *summum bonum* is expressed in the experience of beauty. There is a climactic and non-instrumental quality about the beautiful which makes it different from other experiences which acquire their meaning by pointing beyond themselves. Beauty is a culminating episode; all others by comparison are anticlimactic. So speaks the esthetic personality. A teacher in whom this value reigns supreme is most commonly found in the literary and artistic subjects, although any instructor who stresses technical perfection, form, or style is working in this spirit. Expressiveness, creativity, polish, grace of manner, or even sheer being rather than doing — these are some of the things prized by the esthetic teacher. The well-chosen word, the appropriate act or gesture, the fanciful simile — such are the features of pupil performance to which he responds best. It is not so much the *correctness* of an event as its *charm* that he cherishes. To the esthetic teacher the primary job of

[1] In this, as in the other five values, considerable differentiation is encountered; that is, the value may be most pronounced with certain content and reduced to the vanishing point with other "material." Thus, the theoretical interest may manifest itself in what are known as the natural sciences without being present in the social studies because the latter are not an object of concern. The point of Spranger's classification, however, is that if an "interest" in the material of the social sciences did develop, it would be characterized by the "theoretical" emphasis in a person in whom this was the reigning attitude. Each value represents a characteristic approach to the common experiences of living, *i.e.*, there is a "theoretical" *way* of reacting, an "esthetic" way, etc. It is the mode of response that is vital to this scheme, rather than the situation per se.

education is to make a more attractive world, or failing that, to sensitize the beneficiaries of school life to those aspects of beauty that lie hidden in the ugliest and most repulsive setting.

3. The *economic*, that is, the man whose constant aim is to secure the most results for the least effort. Such a teacher is keenly aware of the material basis of existence, recognizes that his resources are finite, and sees in increasing production the solution to most social problems. This is the spirit of business at its best, but any instructor who makes efficiency his god is elevating the same value. Skill in classroom management from this viewpoint means learning the most in the shortest possible time. His aim is never to use any method of memorizing, computation, exposition, etc., save the one ultimately most economical of human energy. Most of the classroom experiments of educational psychology have been made in an attempt to meet this widely held value. Occasionally this has meant a mastery of effective ways of doing that which should never have been done at all, but this is not an inherent defect of the economic value per se. The economic teacher operates after the manner of the engineer who compares the advantages of alternative methods of production and selects that which will yield the best product for the least cost. Waste and needless loss of human power due to faulty application of techniques or to neglect of those already available are the chief evils that he abhors.

4. The *political*, that is, the one whose major joy is found in the exercise of power over persons or things, but mainly the former. This value should not be assumed to operate only in the sphere of statecraft — it is involved in every situation where a dominant personality is able to control the behavior of others. A teacher of this sort is akin to the centurion of the Gospels who was pleased that his influence was such that when he told his legionnaires to go they went, and when he ordered them to stop they stopped. Instruction of this type is marked by a disciplinary note or by an undisguised effort to indoctrinate or propagandize on behalf of a position congenial to the instructor. The "political" teacher — note the special sense in which

this adjective is used — is most keenly gratified by his capacity to exact compliance with his wishes. Those who adopt a submissive role toward him increase his sense of well-being, whereas those who do not tend to call forth combative responses. At his worst, the political teacher is like a military martinet; at his best he is a devoted and sincere advocate of the ideals to which he is loyal and which he wishes to have adopted by others. Disobedience to authority and thoroughgoing skepticism and criticism of his position are the antitheses of the value that makes him what he is.

5. The *social*, that is, the person who finds friendship, kindness, and benevolent human relations to be the most significant features of his life. Such a teacher is characterized by a parental attitude toward students, a concern for their well-being, and a sensitivity to the injustices that fixed rules may create by their impersonal operation. He is disposed to emphasize his guidance and counseling functions as more important than the strictly didactic, *i.e.*, he is more interested in "people" than in "ideas." Many of the great figures in the history of education (notably Pestalozzi) appear to have made the social their supreme value.[1] At his highest, the social teacher is the great reformer seeking to modify institutions for the better service of all men; at his lowest, he merely satisfies a general curiosity concerning the details of other persons' lives. In either case, the cold, the mechanical, and the "unfeeling" are the aspects of life that arouse his antagonism.

6. The *religious* (better, the *philosophical*), that is, the individual who is most concerned with the totality of experience and his own place within some all-embracing whole. In a teacher, this value is associated with constant attention to the "world model" or

[1] See a quasi-experimental monograph by W. O. Döring, *Untersuchungen zur Psychologie des Lehrers*, Leipzig, Quelle und Meyer, 1925, in which his application of Spranger's criteria also identifies von Humboldt as the esthetic type of teacher, Socrates as the theoretical ("knowledge is virtue"), Basedow as the economic, Francke as the religious, and the representative Jesuit pedagogues as the political. It would be an interesting assignment to make a corresponding identification for distinguished figures in the history of American education or for some contemporary leaders of the profession known to the reader.

world view that the learner is developing. He tries to make the most comprehensive formulation of ultimate reality that his powers permit, and because he is usually aware that something is always escaping him, a note of mysticism is frequently present in his thinking. His relationship to the entire Universe is what counts most. Although Spranger denies that any of the six values can be considered better or worse than the others, he is inclined to look upon the religious as the highest value of all, because the other five are partial and fragmentary in their emphasis while this one seeks to order all values to each other and to fuse them into some unified structure. Teaching of this sort emphasizes consistency and integrity as key outcomes of an education in which character development is central. Its pitfalls are dogma and a confusion of one man's insights with the necessary visions of all others; its strength the unremitting demand for authentic orientation on a grand scale. To the teacher with a religious or philosophical bent, the worst educational offenses are those which emphasize segregated, atomized, discrete, and unorganized experiences.[1]

## BASIC VALUES AND THE INSTRUCTIONAL PROCESS

This application of the Spranger schema to the personality of the teacher is presented not because it is complete or even wholly accurate, but because it seems to portray better the actual motives operating at a mature-adult level than the customary reduction of conduct to oversimplified "hunger-sex-fear" drives. It is more important to know with fair precision what specific values govern a man's purposes now than to trace them with great uncertainty to earlier common im-

[1] Eduard Spranger's system is developed in his brilliantly written *Lebensformen*, translated into English under the slightly modified title of *Types of Men*, Halle, Niemeyer, 1928. This sketch was cast into concrete test form using the method of choice or ranking by Gordon W. Allport and Philip Vernon in the "Scale of Values" blank described in the *Journal of Abnormal and Social Psychology*, 1931, **26**, 231–248. The test, unfortunately, reveals only the relative intrapersonal strength of each value attitude, *i.e.*, whether the political value means more to the testee than the esthetic value; but it says nothing about the *intensity* of either attitude in Teacher *A* as compared with Teacher *B*. The frequency of expression of a value (*i.e.*, its *extensity*) is probably positively correlated with the intensity of its manifestation.

pulses which they no longer resemble. It is entirely possible that there are some teachers who do not fall within any of Spranger's categories; nonetheless he implies that his classification is exhaustive.

The differences among educators in their values is a primary fact conditioning the detailed operation of our schools. Administrative and supervisory officers as a group average a relatively higher political (*i.e.*, power) value than do classroom teachers. Educational research workers likewise have a peak at the theoretical value which marks them off somewhat from other kinds of school servants. Teachers as a group, however, are a bit hard to distinguish from "people in general" in their value pattern. Certainly the differences between men and women teachers in training is the same as that found with nonteaching groups, *i.e.*, the males rank relatively higher in the theoretical-economic-political triad and the females higher in the esthetic-social-religious values, a fact that harmonizes with popular expectation concerning the sexes in our culture.[1]

**What is the connection between the values of instructors and those of their students?** It is probable, but far from fully demonstrated, that the values of teachers in the long run affect the values of their pupils so that the two are brought closer together after a period of mutual contact. In one study by the writer,

> It was thought that the mean valuational profile of each group should be affected in a characteristic manner by the nature of the subject pursued *or* the value organization of the teacher in charge. For instance, one would expect a gain in aesthetic appreciation (as evidenced by a rise in that portion of the scale) after a study of English literature in which canons of taste and standards of beauty in poetry and prose are developed. It is also conceivable that an instructor with a strong "social" trend will subtly increase that dispositional bias in his pupils through the daily expression of opinions, gesture, and other mild hints by which personal viewpoint is revealed.

The data obtained were disappointing, since no consistent trend appeared. Table I shows the results in four college sophomore classes

[1] *Cf.* G. W. Hartmann, Sex Differences in Valuational Attitudes, *Journal of Social Psychology*, 1934, 5, 106–112.

*Table I. Semester Changes in Scores on Different Parts of the Allport-Vernon Scale of Values Blank Made by Different Classes at the Pennsylvania State College*

| | Theoretical | Economic | Esthetic | Social | Political | Religious |
|---|---|---|---|---|---|---|
| *A. Literature* class; N = 24 | | | | | | |
| Instructor's profile (L) | 28.5 | 10.5 | 41.5 | 40 | 19 | 40.5 |
| Initial Mean | 31.33 | 37.08 | 23.83 | 24.79 | 32.75 | 30.00 |
| S. D. | 4.65 | 6.36 | 5.66 | 6.03 | 6.37 | 8.67 |
| Final Mean | 31.75 | 36.79 | 23.25 | 25.54 | 31.96 | 30.33 |
| S. D. | 6.34 | 5.07 | 4.52 | 5.64 | 6.00 | 6.07 |
| Differences | 0.42 | −0.29 | −0.58 | 0.75 | −0.79 | 0.33 |
| *B. Sociology* class; N = 24 | | | | | | |
| Instructor's profile (W) | 39 | 33.5 | 25.5 | 32.5 | 34.5 | 15 |
| Initial Mean | 27.92 | 28.33 | 32.42 | 32.46 | 29.08 | 33.29 |
| S. D. | 6.98 | 7.31 | 10.82 | 7.84 | 8.73 | 10.77 |
| Final Mean | 28.00 | 29.71 | 31.21 | 32.08 | 28.83 | 31.88 |
| S. D. | 6.27 | 7.57 | 9.70 | 6.80 | 8.54 | 9.67 |
| Differences | 0.08 | 1.38 | −1.21 | −0.38 | −0.25 | −1.41 |
| *C. Political Science* class; N = 29 | | | | | | |
| Instructor's profile (A) | 36 | 17 | 45 | 26 | 26 | 30 |
| Initial Mean | 32.52 | 31.28 | 26.31 | 28.31 | 32.93 | 28.21 |
| S. D. | 6.55 | 5.84 | 8.24 | 5.36 | 7.10 | 7.89 |
| Final Mean | 31.93 | 31.07 | 25.90 | 29.90 | 35.24 | 25.66 |
| S. D. | 7.87 | 4.70 | 7.71 | 7.15 | 5.67 | 8.31 |
| Differences | −0.59 | −0.21 | −0.41 | 1.59 | 2.31 | −2.55 |
| *D. Business Psychology* class; N = 36 | | | | | | |
| Instructor's profile (H) | 40 | 31 | 23 | 32 | 21 | 25 |
| Initial Mean | 32.94 | 33.61 | 22.39 | 27.64 | 32.78 | 31.63 |
| S. D. | 7.03 | 5.89 | 6.99 | 5.58 | 6.40 | 7.43 |
| Final Mean | 33.76 | 31.56 | 25.39 | 27.14 | 32.36 | 29.89 |
| S. D. | 6.14 | 6.62 | 7.44 | 5.47 | 7.14 | 7.33 |
| Differences | 0.82 | −2.05 | 3.00 | −0.50 | −0.42 | −1.74 |

in literature, sociology, political science, and business psychology. The most casual glance indicates the absence of any sort of uniformity. What shall one make out of a situation in which a study of literature makes one less aesthetically-minded, a course in sociology less "social," and a semester of business psychology less inclined to prize economic ends? Certainly the largest displacement — a gain of 3.00 in aesthetic attitude after work in business psychology is utterly baffling.

The absence of any association between the character of the

course pursued and the type of attitudinal change resulting makes one suspect that the instructor's own mental constitution may be a more potent influence than the material studied. An inspection of Table I lends no support to this suspicion. Three Junior classes in American history in a local high school, taught by three different men, were examined for further evidence on this point. The data are presented in Table II.

*Table II. Changes in the Various Divisions of the Allport-Vernon Test in Three High-school Classes in American History Taught by Different Teachers*

| | Theoretical | Economic | Esthetic | Social | Political | Religious |
|---|---|---|---|---|---|---|
| Section 1: N = 24 | | | | | | |
| Instructor's profile (C) | 34 | 36 | 23 | 26 | 30 | 31 |
| Initial Mean | 29.63 | 28.00 | 23.63 | 28.92 | 31.25 | 37.63 |
| S. D. | 5.38 | 4.70 | 6.74 | 6.07 | 4.88 | 7.13 |
| Final Mean | 30.50 | 29.00 | 23.38 | 27.70 | 31.33 | 37.54 |
| S. D. | 5.01 | 4.70 | 5.93 | 5.07 | 4.04 | 6.47 |
| Differences | 0.87 | 1.00 | −0.25 | −1.22 | 0.08 | −0.09 |
| Section 2: N = 30 | | | | | | |
| Instructor's profile (H) | 27 | 19 | 24 | 33 | 40 | 37 |
| Initial Mean | 29.00 | 28.33 | 25.80 | 29.57 | 31.03 | 37.47 |
| S. D. | 5.35 | 5.82 | 6.40 | 5.22 | 5.98 | 5.97 |
| Final Mean | 29.10 | 28.10 | 27.13 | 28.30 | 30.43 | 36.67 |
| S. D. | 6.56 | 6.90 | 6.41 | 6.25 | 5.94 | 7.16 |
| Differences | 0.10 | −0.23 | 1.33 | −1.27 | −0.60 | −0.80 |
| Section 3: N = 23 | | | | | | |
| Instructor's profile (S) | 33 | 34 | 16 | 36 | 26 | 35 |
| Initial Mean | 25.26 | 28.70 | 29.70 | 28.83 | 32.30 | 34.83 |
| S. D. | 6.50 | 6.69 | 6.08 | 6.00 | 4.26 | 7.77 |
| Final Mean | 26.43 | 28.30 | 28.60 | 29.42 | 31.65 | 35.74 |
| S. D. | 7.82 | 4.95 | 7.38 | 6.21 | 9.25 | 7.64 |
| Differences | 1.17 | −0.40 | −0.90 | 0.59 | −0.65 | 0.91 |

*C's* dominant value lies in the *economic* field and the maximum mean gains among his pupils occur in his two highest values and the major losses in his two lowest. But *H*, an outspoken "politician" diminishes rather than adds to his students' esteem of power, while in his next weakest trait — the aesthetic — they make the greatest increase! *S's* group generally moves toward his dominant values and away from his lowest; the greatest irregularity occurs in the *economic* column.

Too few instructors are involved to reach any conclusion and the data reveal a highly uneven picture. No relations stand out clearly. It seems that students are repelled as often as they are attracted by the axiological organization of their teachers' personalities; or perhaps they appreciate different attitudes in a detached intellectual way but remain emotionally unaffected thereby. A further explanation may be that the Allport test definitely exposes fundamental and enduring attitudes of the sort represented by Shand's sentiments, which are established so firmly at an early age that modification is difficult or impossible.[1]

Experiments of this sort are subject to the serious limitation that they must assume without specific proof that the "outside" influences operating upon the learner are essentially alike for groups of students in different classes and that the various nonclassroom forces cancel each other, producing no differential effect upon the average scores of contrasted groups. We shall have occasion later to grapple more fully with this intricate question of methodology and interpretation; at the moment, it will suffice if we call attention to the fact that the values of teachers and pupils do not stand alone in the educational world, but that the interaction of both with the values held by historical and traditional figures (as conveyed through the stimuli perpetuated in libraries and museums) and with those of other divisions of the population as they work through "nonschool agencies" accounts for the nature of the final product.

**Is there an optimum combination of values for a teacher?** An interesting question concerning teachers' values is: What is the "ideal" profile of the instructor in this respect? To this the psychologist can give no very satisfactory answer at present except to say that it appears to be implied in the very act of teaching different individuals that the teacher be more than ordinarily sensitive to *all* kinds of value experiences. "Blind spots" in students are bad enough, but in an instructor they become a positive handicap. A theoretically minded teacher, *e.g.*, one who must aid in the development of a

[1] G. W. Hartmann, *Measuring Teaching Efficiency among College Instructors*, New York, *Archives of Psychology*, No. 154, 1933, pp. 41–43.

pupil who is basically "esthetic," is doomed to inefficiency in this case unless his appreciations in some way embrace this field. Otherwise he is deprived of a "handle" by which to manipulate the other person's responses. Two junior-high-school teachers may display the value patterns shown in Figure 2. Even if these instructors were

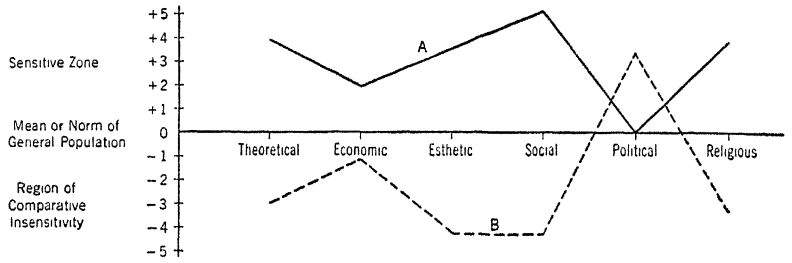



FIGURE 2

Hypothetical value profiles or "curves" of A (an "acceptable" or desirable teacher) and B (a "doubtful" teacher).

alike in all other respects — an improbable state of affairs — it is clear that *B's* sympathies with many kinds of learners would be too weak to enable him to be in *rapport* with them. The "power drive" is his only pronounced strength and it is a peculiarity of this value that it is more likely to produce conflict than "kinship" with others who hold it in marked degree. Teachers who resemble *B* in having most of their value curve below the central line but whose primary good lies in some area other than the "political" may be of distinct service to a limited group of learners because of their highly specialized and intense enthusiasm. On the whole, it seems likely that more students will benefit more from a teacher whose value pattern approximates a uniformly straight horizontal line at about + 2 on the scale than they would from one who falls at + 5 in one respect and drops to the norm or below in all others. The ideal educator's profile cannot be indicated with as much assurance as the definite *direction* in which it is inclined. For most educational situations with an unselected student group, a high-order "generalist" is to be preferred to a "specialist" in a single value region. In other words, a teacher whose personality organization resembles Goethe or Milton

in his " omnivorous " life of impression and expression is more nearly the perfect or universal pedagogue than one who resembles Beethoven with his single overwhelming interest.

## THE STATUS AND PRESTIGE OF THE TEACHER — HIS VALUE TO OTHERS

A teacher's most important personal property is the value system to which he gives his allegiance. Through it he exercises his influence upon his pupils. Their assimilation of the stimulations he provides is in turn determined by the pattern of " goods " which each individual learner brings to such experiences. This significant relation compels every teacher to be, in some measure at least, a student of the value problem, for it underlies not only all that takes place in education but every experience that human beings can have. It is only because men place a positive valuation upon the school as a social institution that it exists. It is only because this book or the present page has some value (however slight!) to you as a reader that your eyes are being directed toward this material at this time. Man is fundamentally, although not exclusively, a *valuing* creature. If this fact is central to life, it must also be central to learning and teaching which are but aspects of the larger whole upon which they depend.

Effective teaching begins as soon as one asks, " What are the values of others? How can I contribute to their realization without forfeiting or sacrificing my own? If others' values — or my own — are inadequate in some respect, how can they be altered so that a heightening rather than a lowering of everyone's values will result? " Such self-inquiry is peculiarly appropriate to teachers whose professional and personal lives are built directly around the concept of improvement, although intelligent action in the domains of statesmanship, industry, medicine, engineering, and " practical " affairs generally rests upon a similar foundation.

An important factor limiting the attempts of teachers to maximize the values of their pupils (and, incidentally, of themselves) is the place which teachers occupy in the vocational hierarchy. Every dis-

tinguishable career in all cultures has a fairly definite place in some loosely conceived scale of esteem or respect. This position is not fixed, for it moves upward or downward with changes in the objectives of the community, alterations in the quality of the persons found in different vocations, and differences in their service to the general population. Nonetheless, it is important to know for any given time and place just what status teachers as a functional group enjoy in the eyes of members of other occupations.

**An experiment concerning "status."** Prestige is hard to measure by any other than ranking methods, but these can be very refined. Apparently, people can give their own subjective order of merit not only for a judge and a barber, but also for a secondary-school teacher and elementary teacher — both categories frequently lumped into "public-school teaching." In one study, a group of adult individuals was given the following instructions:

> On each of the accompanying cards you will find the name of a familiar occupation. You probably do not feel the same about each one. Place the cards in the *order of your admiration* for the professions or vocations here given. Try to answer for yourself the question, Which occupation do I respect most? Then ask, Which occupation do I think least of? Finally, place all the remaining occupations in their proper position, according to your esteem for them. Do not base your judgment upon any particular person, but simply rank the occupations according to your *general opinion* about them.[1]

From these separate ratings, the composite picture of Table III was derived. Note the clear evidence of an educational hierarchy in the italicized items.

This prestige "ladder" is obviously a datum of considerable importance as the morale and happiness of many persons are strongly affected by the opinions of others. The order of the occupations in this table is highly correlated with such personal attributes as intelligence and educational achievement, and to some extent associated

[1] G. W. Hartmann, The Prestige of Occupations, *Personnel Journal*, 1934, 13, p. 146.

*Table III. Rank Order of Prestige of 25 Occupations in the Judgment of One Hundred Representatives of Other Occupations*

| Rank Order | Occupation | Mean Position |
|---|---|---|
| 1 | Physician | 3 95 |
| 2 | Lawyer | 4.58 |
| 3 | *College professor* | 4 84 |
| 4 | *School superintendent* | 6.25 |
| 5 | Clergyman | 6 49 |
| 6 | *School principal* | 7 81 |
| 7 | *High-school teacher* | 8.93 |
| 8 | Government employee | 9.19 |
| 9 | *Elementary-school teacher* | 9.86 |
| 10 | Electrician | 10.17 |
| 11 | Machinist . | 11.54 |
| 12 | Bookkeeper | 12.16 |
| 13 | Farmer | 12.39 |
| 14 | Carpenter | 12.59 |
| 15 | Baker | 14.00 |
| 16 | Store clerk | 15.67 |
| 17 | Policeman | 16.27 |
| 18 | Chef . . | 16.51 |
| 19 | Barber | 16.56 |
| 20 | Truck driver | 17.73 |
| 21 | Laborer . . | 19.50 |
| 22 | Janitor | 21.39 |
| 23 | Messenger | 21.58 |
| 24 | Night watchman | 21.66 |
| 25 | Bootblack | 23.20 |

with income, suggesting a rough performance continuum which individuals have in mind as they rate these careers. Conceivably, the hierarchy means nothing more than the type of occupation which the raters would desire for themselves were they free agents. However, the valuational factor is clearly present whether we view the list as an " order of esteem " or an " order of desire."

That the world of value is not as hopelessly subjective and inconsistent as many writers have claimed appears in the phenomenon of occupational insight. By this is meant the surprising accuracy with which " self-ratings " of each vocational group agree with the relative positions assigned to them by other occupational classes. Contrary to the expectations of those who consider vanity and egocentrism

*Table IV. Mutual-status Ratings Conferred by 167 Individuals in Northeastern Pennsylvania*

Figures in parenthesis represent the average deviations of the means they accompany; italicized figures are "self-ratings."

| Occupations Rated | Vocations of Interviewees Making Ratings | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Physician | College Prof. | Civil Engineer | Lawyer | High-school Teacher | Grade-school Teacher | Post-office Clerk | Grocery Owner | Stenographer | Coal Miner | Plumber | Truck Driver | Others' Grand Averages |
| Number | 10 | 10 | 7 | 13 | 18 | 20 | 15 | 10 | 20 | 20 | 4 | 20 | |
| Physician | *1.10* (0.18) | 1.50 (0.70) | 4.42 (3.06) | 2.07 (0.57) | 2.33 (0.93) | 1.65 (0.81) | 1.20 (0.35) | 1.3 (0.26) | 1.7 (0.77) | 1.55 (0.61) | 3.0 (2.00) | 1.45 (0.63) | 2.02 (0.68) |
| College professor | 2.50 (0.80) | *2.40* (0.72) | 2.85 (0.74) | 3.84 (1.68) | 3.16 (1.18) | 3.95 (1.06) | 2.93 (0.88) | 3.1 (0.78) | 2.85 (0.71) | 2 4 (1.36) | 3.25 (0.75) | 2.95 (0.97) | 3.07 (0 35) |
| Civil engineer | 4.10 (0.94) | 4.7 (1.10) | *2.85* (1.06) | 4.38 (1.24) | 4.32 (1.78) | 4.7 (1.39) | 3.66 (1.02) | 4.5 (0.14) | 3.86 (1.04) | 4.8 (1.02) | 5.0 (3.0) | 3.3 (1.04) | 4.29 (0.43) |
| Lawyer | 5.70 (3.58) | 3.2 (1.68) | 7.0 (3.14) | *1.46* (0.57) | 4.83 (2.13) | 4.75 (2.0) | 3.73 (1.64) | 3.4 (0.20) | 2.5 (0.12) | 3.6 (1.42) | 6.0 (3.5) | 3.0 (1.0) | 4.34 (1.20) |
| High-school teacher | 4.20 (0.80) | 4.4 (0.60) | 3.85 (1.89) | 5.30 (0.99) | *3.66* (1.30) | 4.15 (0.93) | 4.86 (1.14) | 5.1 (0.74) | 4.8 (0.62) | 4.95 (1.01) | 4.0 (1.0) | 5.2 (0.65) | 4.62 (0.45) |
| Grade-school teacher | 5.50 (1.30) | 5.9 (1.7) | 4.71 (2.61) | 5.61 (1.09) | 5.00 (1.33) | *3.65* (1.95) | 6.13 (1.34) | 6.4 (0.76) | 5.9 (0.57) | 6.05 (1.83) | 5 25 (2 25) | 6.3 (0.96) | 5 70 (0.32) |
| Post-office clerk | 7.70 (0.70) | 7.6 (1.12) | 8.42 (1.51) | 9.69 (1.46) | 8.22 (1.33) | 8.3 (0.99) | *7.13* (1.66) | 8.5 (1.0) | 7.25 (0.93) | 7 35 (1.15) | 7.75 (1.25) | 7.65 (1.16) | 8.04 (0.53) |
| Grocery owner | 7.70 (0.90) | 8.9 (1.72) | 7.85 (2.12) | 8.9 (1.18) | 7.72 (1.28) | 8.7 (1.62) | 8.86 (1.38) | *7.1* (2.5) | 9.05 (0.58) | 7.9 (2.45) | 9.5 (1.25) | 8.2 (1.70) | 8.48 (0.55) |
| Stenographer | 8.60 (1.68) | 10.0 (1.20) | 9.28 (1.39) | 8.1 (1.41) | 8.83 (1.37) | 8.3 (0.99) | 8.2 (0 85) | 8.7 (1.1) | *7.65* (0.92) | 8.4 (1.64) | 8.5 (1.55) | 8.45 (1.60) | 8.67 (0.39) |
| Coal miner | 9.90 (1.5) | 9.2 (2.28) | 7.57 (1.79) | 8.3 (2.51) | 9.62 (1.58) | 8.7 (2.16) | 11.2 (1.04) | 9.2 (2.56) | 11 05 (0.86) | *9 45* (1 55) | 7 5 (3.0) | 10.55 (1 23) | 9 34 (1.01) |
| Plumber | 9.70 (1.1) | 9.9 (0.92) | 9.28 (2.1) | 9.1 (1.24) | 10.5 (0.89) | 10.25 (1.0) | 9.46 (0.97) | 9 3 (1.44) | 10.3 (0.86) | 9 9 (0 83) | *7 0* (3.0) | 9 95 (0.87) | 9.79 (0.38) |
| Truck driver | 11.1 (0.90) | 10.3 (1.24) | 9.85 (1.59) | 11.0 (0.77) | 10.88 (1.16) | 11.2 (0.72) | 10.46 (0.84) | 11.4 (0.84) | 11.15 (0.60) | 11.65 (0.46) | 11.25 (0.75) | *11.0* (1.0) | 10.92 (0.42) |

the chief human weakness, there is no marked tendency to over- or underestimate the prestige of one's own occupation. This is clearly seen in Table IV, where a dozen occupations rated each other and themselves. It is interesting that the elementary- and secondary-school teachers when rating themselves emerge on an equal level — an outcome wholly in accord with contemporary educational philosophy — but the rest of the world definitely sets the high-school job ahead.

**Educational consequences of a " caste " society.** Prestige differences as stable and substantial as those here revealed are disconcerting to the democratically minded educator who sees in them a reflection of an unworthy system of social stratification. Apparently, most people (including the individuals compared!) agree that the average coal miner does not embody their highest values as well as the college professor. Whether this opinion is objectively valid or not, it is a fact which greatly favors the professor in his educational endeavors. Suggestions emanating from persons or groups high in prestige are far more persuasive than those coming from low-prestige sources.

The intricate interlocking of all human values is convincingly displayed in this hierarchical phenomenon. A community esteems certain groups according to the values that prevail within it; the specific values of the higher groups are consequently more readily achieved than those of the lower; the lower groups accept the valuations of the higher. The function of leadership in value formation for most of the population therefore devolves upon the teacher — not so much because he represents a group well above the average citizen in intelligence, culture, and socially desirable conduct, but because he has the psychologically very real thing termed " status " and is in a position where the values of others are peculiarly susceptible to modification.

. . . The public school teacher stands lowest among the accepted professional groups, but definitely above the great body of business, industrial, and commercial pursuits. If the public school teacher lacks caste, it must be only with the numerically small professional groups who stand above her; certainly this does not hold for the great

body of citizens who fall below her in "status." If "average" social status is represented by the mean positions of such diverse vocations as salesman, nurse, bookkeeper, farmer, and carpenter, then there is not the slightest doubt that teachers as a class stand above these in "repute." In the eyes of the well-established professions, the school teacher may well suffer that uncertain appraisal which has historically been the fate of every semi-profession during its transitional stages but in the eyes of the larger body of non-professional claimants she stands definitely among the elect.[1]

## SUMMARY

Educational psychology cannot deal with pupil needs alone, vital as these are to the efficient conduct of the learning process — it must also consider the "private" values of the instructor who is the guide of these activities. These values include the basic purposes of the teacher and the "style of life" by which he approaches and interprets all experiences. Every person has some "system" of values which governs his choices and behavior in matters large and small. This is illustrated by the Spranger theory of personality which makes possible the isolation of the theoretical, esthetic, economic, social, political, or religious type of teacher, determined according to the value which dominates the instructional situation. The values of teachers do not operate independently, but in conjunction with (or against) the values of their pupils and other groups. It is suggested that the most satisfactory teacher is the one whose nature is such that he can be "resonant" in some measure to all the values that his students exhibit. The ability of a teacher to exert his influence upon the values of those in his care is a function of many forces, notably that of his own representative value or prestige to the community he serves. The status of different occupations can be ascertained by the combined ranking and sampling method which shows that there is a hierarchy of vocations that roughly parallels the order of their correspondence to the values of the general population. It is fortunate that the various forms of educational service — college professorship, school super-

[1] *Ibid.*, p. 151.

intendency, principalship, secondary and elementary teaching — are all relatively beyond the median of occupations in the prestige which other citizens confer upon them. This circumstance facilitates the acceptance of the values of educators by the public, although by itself it says nothing of the objective validity of these values as such.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. On the basis of your familiarity with the lifework of Horace Mann, sketch his approximate value profile according to the Spranger scheme as illustrated in Figure 2. Do the same for John Dewey. Compare the appearance of these two profiles with corresponding ones prepared by some other student of this text and try to account for the agreements and disagreements in your "curves."
2. Is it possible to be a teacher or student of anything without some awareness of the "worth" of that with which one is dealing? Defend your answer.
3. What important value categories, known to you through personal experience, appear not to be included in the sixfold classification made by Spranger? Are these omitted or neglected items of educational significance?
4. How do you explain the positive correlation between the prestige of various occupations and the mean intelligence, amount of schooling, and income of those who are engaged in them? What are the limitations of your interpretation of this observed relationship?
5. Indicate what seem to you to be the beneficial and the hurtful consequences of the existence of the professional educational hierarchy represented by the italicized vocations in Table III.
6. One study of American culture (viewed in its entirety as an organic whole) maintains that our society tends to rank the major values in this descending order: Economic, political, theoretical, social, religious, esthetic. Is this your impression of the way in which the average folks of your community arrange their values? Do you see any special significance in the fact that the first three in the sequence just given are the values which men typically place highest and the others those which women typically rank highest? Has this any pertinence to the prestige of public-school teaching in the light of the sex ratio found in this career? Does this help explain

those occasions when you felt inferior about your personal values in comparison to those of others?

7. What are the possible and probable effects of the presence or absence of congruency between the values of an instructor and the average values of his pupils? Does one characteristically learn more from those whose values are like one's own or from those whose values are noticeably different?

# Chapter 3

## THE HUMAN ORGANISM AND ITS EQUIPMENT

One attempt to reduce the complexities of education to manageable form declares that it can all be summarized in the phrase, "Teaching Johnny X." In this formula, "teaching" is equated with all procedures covered by classroom methodology, "Johnny" symbolizes all young learners, and X is the curriculum content in either generalized or specific form. As is true of most condensations of this sort, much that is essential is simply and conveniently expressed by this reduction, although from the viewpoint of this text, it would be more correctly stated if it read, "Changing Johnny from condition X to condition Y." In either case, "Johnny" is *the* vital factor in the process; it is for his sake and for the sake of those who are concerned about him that the school exists. About him all teaching and all curricula revolve. Consequently a knowledge of how he came to be what he is and how to change him for the better are prerequisites to competent instruction. It is the first of these requirements, *i.e.*, the broad foundations underlying all human behavior, that shall occupy us throughout this chapter.[1]

### THE PRIMACY OF THE BODY

A living creature is most readily identified by its physical presence. The material organism of man is the most obvious part about him.

[1] Another way of characterizing the context of this paragraph is to say that the qualified teacher must know the *world* in its different aspects, the *school* as an operating entity, and the *child* for the purpose of furthering his development and welfare. As implied in Chapter 2, the teacher must also know *himself* or he cannot properly discharge his functions. Of course, a *generalized* account of human conduct applies equally well to *both* teacher and pupil.

If one wishes to point out a stranger to someone, he is referred to as the tall, dark, handsome, etc., person (all bodily epithets), and not as the intelligent, careful, generous, etc., individual (adjectives whose meanings emerge only by interaction with more intricate situations). Nonetheless, there is an ancient educational tradition, whose powerful influence continues to be felt today, which definitely undervalues the body and looks upon it as important only to the degree that certain mental processes occur in conjunction with it. This view holds that man's body is the seat of psychic functions which operate more or less independently of their temporary location and which continue to have a real existence or effect after death. Such an outlook is usually called *dualism*, because it sees the body as one constituent of reality and the mind (or "soul") as another of equal if not greater importance.

Opposed to this position is *naturalism*, which claims that the human organism has, to be sure, both anatomical structures and physiological or psychological functions, but that fundamentally only a single order of reality is present. The body breathes, runs, and digests, but it also loves, dreams, and writes history — to name but a few of its varied activities. To the naturalist, man's frame is built of the same parts that are also found in the sun, the moon, and the stars; the substances that comprise him are derived from the earth (or solar system) and to that earth they ultimately return.[1] Life is simply the special manner in which these energies are combined: Destroy this basic or unique organization and the "organ-ism" ceases to be such and becomes something else. What is called "mental life" is just that aspect of life which appears distinctively in our more subtle adaptations as memorizing, painting, debating, etc. Essentially, however, it is the living body — or, if one prefers, the active organism —

[1] It may be of interest to record here that an ancient reforming Pharaoh, Amenhotep IV of Egypt, better known as Akhnaton, who flourished about 1365 B.C., made the sun the source of all power and life. Men are the children of the sun — emanations ultimately born of his rays and in this sense, eternal. Zoroastrianism, Mithraism, and many other honorable religions of antiquity held essentially the same view.

and not anything separate and distinct from it which solves algebraic equations, composes sonnets, and predicts eclipses.

The contrast between the transcendental (or dualistic) standpoint and that of naturalism is far richer and deeper than this brief characterization implies. It is presented in this oversimplified form because a basic presupposition of this text, *viz.*, the correctness of the naturalistic approach, accounts for many of the detailed explanations or descriptions to be given later. With the exception of the Catholic or neoscholastic psychology,[1] all the schools of psychological thought now operative in America do not go beyond observable or inferred experience for their causal concepts, *i.e.*, they are all non- or anti-transcendental in temper.

**Significance of "monism."** This preliminary discussion is crucial to the best contemporary view of the nature of the human organism. One never finds minds without bodies, but unfortunately one can encounter bodies without minds in any true sense because the corporeal conditions of their presence are not fulfilled. Therefore, that which is termed "mental" is really a derivative or special manifestation of the physical and not a distinct order of existence. A melody, for example, is as genuinely corporeal as the piano that is used to produce it. Man as a living entity is a structure or system of organs put together in a certain way. Deprive him of one of these major organs, *e.g.*, the brain, and he ceases to live, since the fate of the rest of his entire system is linked with the destiny of this mass of tissue; disturb it in even relatively minor ways — through impaired nutrition, a broken cerebral blood vessel, or mechanical injury to the cortical fibers — and his behavior is unfavorably altered and in rough proportion to the severity of the disturbance. *This dependence of psycho-*

[1] Often called Thomism after the great medieval thinker, St. Thomas Aquinas, who systematized this position in final and definitive form. Much of fundamentalist Protestantism and many of the attenuated modernist versions of theism are like it in their opposition to naturalism in science in general and in psychology in particular. Actual educational procedures conducted under such auspices reveal many naturalist components, suggesting incomplete integration of beliefs, a problem of importance not only to mental hygiene but to the internal consistency of social institutions and their harmony with each other.

*logical phenomena upon the state of the body is absolute.* Man cannot see without his eyes, write without using certain muscles, speak without using his vocal cords, or think without his nervous system. The only way a teacher can influence his pupils is through some energy produced by his organism; and the only way they can react to him is by some process initiated by their bodies. Educational psychology cannot neglect the body, for the elementary reason that that is all the human being *has* and *is*. In this sense *physical* education (or education *through* the physical) is the only kind that takes place or can possibly occur.

To many persons, the view that psychology is a study of what the organism does and experiences seems like the "grossest materialism." A "mindless" psychology to them is a contradiction in terms. Such reactions are probably due to misinterpretations of the position here defended. An "organismic" psychology does not deny the reality of conscious states, purposive behavior, or passionate devotion to the ideal community — indeed, it vigorously affirms their central significance. It declares that the human body (or organism) not only eats, breathes, and, in conjunction with another human, reproduces its kind, but that this same observable "energy system" also learns to spell, to govern other beings like itself or even very different kinds of animals, and to ask questions about its origin and eventual state. This is what is meant by the insistence that man is an organic unit. It does not mean any lowering of one's estimate of the human personality to consider this personality identical with the body and its innumerable functions and possibilities. *If we wish to be kind or just to another member of this species, the only way we can reveal this is by what we do to his body.* An undernourished child is helped by being given more milk (among other things) in order that his body may look and act more satisfactorily; an ignorant man is aided by making it possible for his body or part thereof to do the right thing at the right time in the right place; and a cruel man becomes a humane one when his organism ceases to injure other bodies and becomes instead an instrument for furthering their health and integrity.

This identification of the individual organism with the body and its properties is the logical consequence of the naturalistic approach to human behavior. It is a fact of elemental significance to every aspect of educational psychology, and the sooner it is acted upon by both teachers and learners the greater and more beneficial will be its consequences in their lives. To make the body live longer and better; to make it stronger, more beautiful, more skillful in the work of hand, tongue, and brain; to make this body live peaceably and happily in the company of other bodies; and to make it understand, predict, and control its own conduct and experience — these are some of the many complex ways in which the needs of the organism are expressed. What used to be called the " spirit " of man manifests itself in these and similar processes. Our most intricate dealings with the environment and our neighbors center about the relations between a developing body and the natural field in which it is found. Such a view of human nature is far from being ugly or debased; instead, it supplies education with a hopeful and positive attitude justified by the most authentic deliverances of psychology and the whole structure of contemporary science.

## GROWTH AND THE BEGINNING OF INDIVIDUALITY

Every organism has a history which accounts for its present state. Our bodies are outgrowths from the bodies of our parents, the male parent providing a certain cell called the spermatazoön and the female a cell called the egg or ovum. The junction of these two specialized and minute structures in the biological act of fertilization marks the formal beginning of every person's development, although it is also possible to refer this back to the formation of the component germ cells within the parents which necessarily antedates their physical union. This is the prepsychological stage of one's life, although the constituents which produce the personality have already exhibited organic behavior. The ripe unfertilized egg is a relatively inert thing until a sperm cell has penetrated it and made it fertile. The male cell is a more lively bit of protoplasm, actively propelled by a long

tail appendage. As soon as it strikes an egg it digs through the jellylike coat surrounding the ovum and thereby starts the whole cycle of growth and development. This act of fusion is succeeded by a change in the surface of the activated egg which makes it impossible for other sperm to enter. The human embryo — a new organism — is thus launched on its career.

In what follows thereafter, one notices a rapid and amazing change from a simple and uniform mass to an elaborately differentiated structure possessing "human" outlines. The process is essentially one of segmentation, *i.e.*, the original cell divides repeatedly until a multiplicity of closely associated daughter cells emerge. These are distributed in a pattern characteristic of the species, suggesting that the fertilized egg must already contain some guiding forces which control its subsequent development. This period of growth within the uterus of the mother is necessary if the complex body of a higher organism is to be built up from a single cell. Organs are formed in a fairly definite sequence and in relation to their place in the rest of the embryo. Where once homogeneity existed, heterogeneity of structure and appearance emerges. To this entire process the term *differentiation* has been appropriately applied, since a primitive unity is succeeded by a more elaborate and complex entity. The essential work of shaping a recognizable human being is done within about 100 days after conception (about which time the mother can first notice the child stirring); the rest of the normal nine-months' period of pregnancy is almost entirely devoted to an increase in the size of the unborn child and the enlargement of parts already formed.

**Parallelism of mental or educational and bodily growth.** This prenatal process is of deep significance to both education and psychology because in it may be seen many of the principles which govern bodily growth at later stages in the life cycle. Embryologically the development of an organism can be analyzed into a sequential series of structural patterns. In other words, change of shape — or, more technically, morphological transformation — is the most obvious alteration which converts the spherical thing that all of us once

were into the wholly different contours of the human adult. Growth must take place at *unequal* rates in different parts of the organism before this modified aspect is produced.

Among biologists it is customary to hold that the development of the organism (following stimulation of the ovum) is exhausted in three processes: cell division, growth, and differentiation. From our standpoint, however, it is more convenient to consider all these processes as growth, rather than restricting this term to mere increase in size which is just one way in which the organism develops. The production of new protoplasm is basic to all growth and occurs whenever anabolic processes in the living system are greater than the katabolic ones. But cell division must also occur up to a certain point if an adult creature is to be produced; after a time, however, they normally stop dividing. A small amount of growth always remains possible to care for the healing of wounds and other repair needs of the adult. A high degree of differentiation means that the organism is near its "natural" growth limit; conversely, a low measure of differentiation between the various cells implies that growth is in its early stages. During the initial weeks of embryonic life, it is obvious that tissues and organs differentiate from an earlier more uniform "material" because functions cannot be performed until a certain amount of differentiation has occurred. However, in later phases (notably childhood) the further (or genetically secondary) differentiation of our organs (such as muscles) is determined by their functioning.

One of the great mysteries of growth — and this feature of life is indeed a profound mystery — appears when one inquires how certain parts of the organism come to be where they are. Why do fingers grow out of our hands and not upon our backs? How does the eye happen to be located near the top of the head and not in the middle of the chest? Part of the answer is found in the fact that this is what they ordinarily do, but monsters (*i.e.*, deformed organisms) are occasionally born and indicate that unless external factors are reasonably normal and constant, the developed creature will de-

part from the norm of the species to which the parents belonged. Axial gradients, differences in electric potentials, and other explanatory concepts have been employed to account for the order and location of various parts of the body. Hereditary factors *alone* do not tell the full story since it is clear that the uterine conditions must be of a certain kind before the anticipated growth of the child can occur. Growth is an amazingly elaborate process in which many development-producing or -inhibiting substances (such as vitamins and glandular secretions) and external factors (such as exercise and stimulation) co-operate to mold the final outlines of the individual.

**The basic pattern of growth.** The simplest way to schematize this complex succession of events is to portray the relationships as follows:

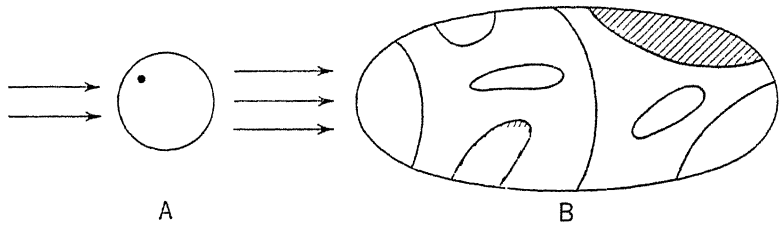



FIGURE 3

One greatly oversimplified method of representing the development of the individual human organism. *A* is the original undifferentiated state of the fertilized egg; *B* is the same system in a more mature phase of differentiation; the arrows to the left of *A* may be thought of as standing for "hereditary factors" and "external conditions," respectively; the arrows to the right of *A* may be construed as the three processes of "cell division," "differentiation," and "growth" in the narrow sense of additional bulk.

This picture of growth is important if for no other reason than its suggestive and analogical value for many problems in educational psychology. The way in which a child's organism is built up may well be the basic pattern or paradigm followed by all forms of later development which he exhibits. Mental (or neural) growth reveals many phenomena that strongly resemble in their design those encountered in tracing the successive phases by which a fertilized egg becomes an embryo, an embryo a fetus, a fetus an infant, and a child

an adult. Perpetual growth, or the method by which one becomes intimately acquainted with the details of a visual object, reveals a parallel that is almost too perfect to be true. The reader may test this upon some friend by using the stimulus pattern shown in Figure 3 in the following way:

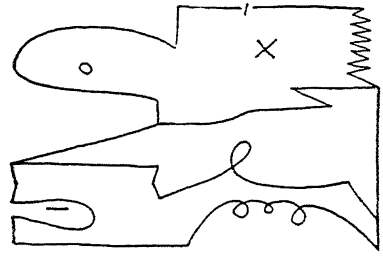


FIGURE 4

A nonsense drawing which can be used to illustrate the growth of a percept from the undifferentiated to the differentiated stage.

Tell your acquaintance that he will be shown an unfamiliar figure for a very brief moment and that he should try to copy it exactly as seen upon a sheet of paper. He will probably need several exposures before he gets it essentially correct. Tell him to make each drawing upon a separate sheet and to number the pages consecutively. Each sketch must be made independently. The first reproduction will probably catch the general outline of Figure 4 with amusing errors and omissions of details. Later drawings show that "more" features are seen following repeated exposures until finally the arrangement of the items corresponds quite exactly to their place in the original. This progression from a vague, unclear, and unstable "something" to a more sharply defined and accurately scaled percept is one form of cognitive growth. The fact that the term "differentiation" fits this type of situation so well is probably not accidental, but a symptom of the underlying kinship between the process by which our organs emerged from an organless entity and the manner in which we become oriented in the visual world. All behavior is full of examples of such correspondence, as will be seen frequently in the following.

## THE ROLE OF THE SENSES IN ADAPTATION

The susceptibility of the human organism to stimulation is known as *sensitivity*. Without this property the body would be unable to respond to the outer world or even to events occurring within itself. Although every part of the organism is sensitive to some type of energy that strikes it, the body is not uniformly sensitive but receives "information" about the environment through specialized structures called sense *organs*.

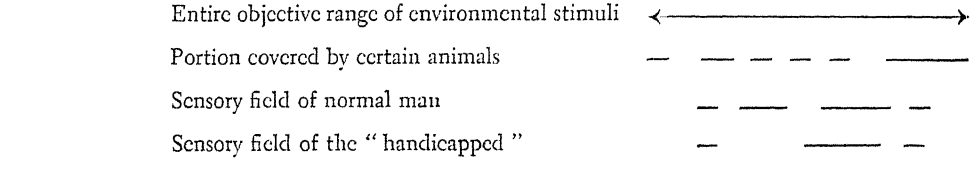
The eye, ear, nose, tongue and mouth, and the skin are the conventional "five senses," although a little reflection and examination shows that the human being experiences more than five *kinds* of sensory events. For example, if one shuts one's eyes and permits another to move one's arm through space, one has no difficulty in knowing when one's arm is pointed straight overhead, when it is held in front, at the side, etc. This observation points to the presence of the kinesthetic or muscle sense by which the organism is informed of the action and location of its own parts, although in the instance just cited, joint, tendon, vascular, and vestibular stimuli combine to provide all the clues the subject uses; it seems clear, however, that visual, auditory, olfactory, gustatory, and most cutaneous elements are excluded. In addition, the skin sense is not a unitary quality such as "touch" implies, but a multiple affair which compels psychologists to speak instead of the skin senses, of which four have been distinguished: pain, pressure, temperature (warm and cold separately), and contact. Organic sensitivity of the type displayed in nausea suggests that the inside of the body is also provided with some means of letting the central nervous system know what is happening there. However, the presence of most sensory structures near the surface of the body indicates that they are essentially instruments for reporting occurrences in the organism's environment. Seeing, hearing, and smelling are forms of distance reception; the remaining senses are contact receptors or reporters concerning the orientation or other states of the body.

The fact that most of the sense organs are in the head end and grouped about the entrance to the digestive system implies that they are guardians of the integrity of the rest of the system. The cephalic portion of the creature is the one in first and closest touch with the changes in environmental conditions as the system moves through space; the importance of the brain, therefore, may well be a consequence of its proximity to the principal sense organs found in the head. Man's upright posture in some measure obscures this original condition. Nonetheless, our undeniable relationship to other animals where the head is the bow of the moving vessel suggests that the head is important because of the brain, the brain because of the sense organs, and these because of the mouth by which nourishment enters the organism. Evidently, food getting is the most fundamental of all living activities, for so much structure and function is built around it.[1]

**Learning and the receptor organs.** Without the senses, education as we know it could not occur. These structures condition the organism's range of experience, for any limitation in them gives rise to some limitation in the subject's conscious life. Merely because his eyes do not serve him as they serve a normal-sighted person, a blind child is not prevented from learning; but the world of colors which he must infer is much less rich in meaning than the one to which others who can see them respond directly. It is futile to expect a congenitally blind person to react significantly to the difference between a yellow and a blue circle. Similarly, the deaf individual exhibits about the same type of adjustments to life situations that a man with ordinary hearing can make, but he is nonetheless "handicapped" in a number of important respects.

[1] Freudian psychoanalysis, by contrast, emphasizes the processes which center about the tail end of the body. The intimate connection between the reproductive and the eliminative functions is basic to this view of human behavior. Undoubtedly the caudal extremity of the organism was in danger of being neglected or forgotten by those who focused their attention upon the cephalic region. The former area is more strongly motor and the latter dominantly sensory in terms of its major activities. A truly comprehensive psychology will embrace both aspects, *i.e.*, the sensorimotor features or the head-tail processes.

Persons with sensory deficiencies merely illustrate vividly the general restrictions under which the human organism operates in its dealings with the world about it. Not only is our smell poorer than the dog's or the deer's, but the sensory constitution of some animals enables them to react to forms of stimulation to which we can give no immediate response. The ordinary housefly apparently can "see" ultraviolet rays, a portion of the light spectrum to which the human eye is insensitive;[1] certain birds apparently can hear sounds of a high pitch well beyond the upper threshold of audibility for us;[2] during the course of an individual's lifetime, his sensory field may expand (*e.g.*, with instrumental aids such as spectacles) or contract (*e.g.*, with diminished acuity due to age, injury, etc.). Men are not structurally equipped to react to all the forms of energy that the physical world contains, but only to certain selected portions thereof. The situation may be schematized as shown in the accompanying sketch.




The gaps in man's response system are occasionally disconcerting, as when one temporarily loses his olfactory acuity during a severe head cold, but ordinarily they go unnoticed and we remain unaware of a world of energy above and below the thresholds which confine our "sensible" domain. The "silent areas" in the sensory field

[1] Experiments by animal psychologists in illuminating eating surfaces with radiant energy of wave lengths shorter than the extreme violet and lying beyond the visible spectrum (of man) show that flies learn to congregate on spots where X rays are centered if food is consistently supplied at these points and not on other areas differently illuminated. Other creatures similarly make discriminations where man notices only an identity. Conversely, man reacts to differences where other creatures observe only likenesses.

[2] Sir Francis Galton, using an air-pitch whistle invented by him, found that few adults could hear sounds of more than 20,000 to 40,000 vibrations per second, but that many birds in a zoo responded actively when tones well above this value were produced.

are inferred from the behavior of other living creatures, from the indicators of instruments which convert the hidden energy into a form readable by the human investigator, or from the implications of the experience of those persons who have lost or gained control over a specific region. Man's bodily constitution accounts for his inability to deal with *all* that the universe apparently contains, but it also makes it possible for him to respond to as much of it as he does.

If we could imagine a human being wholly without functioning sense organs, we would have a creature who could be called uneducable, since there would be no way for the environment to affect him other than by gross impact; also, he could not know when he was interacting constructively with any situation. A pupil without vision, hearing, taste, touch, etc., would lack all prerequisites for being a true pupil. Such a hypothetical creature could not live, for some intact sensation system is necessary if life is to be maintained among the higher organisms. Instruction ordinarily presupposes eyes (or fingers) to read and ears to listen. Chemistry requires some discrimination of odors, home economics some literal sense of taste, and athletics some kinesthetic powers, even if nonschool life had not earlier imposed similar demands.

## THE WORK OF THE MUSCLES AS ORGANS OF RESPONSE

An educational psychology which respects the human body with all its structures and functions as the locus of the behavior it studies must not only rest its recommendations upon a defensible view of the importance of the organs of sense in our adjustive life, but also needs to include those portions of our being that act positively upon the world. The organism does not just receive *impressions:* it also serves as an instrument of *expression.* This double aspect of all experience is crucial to all understanding of man's conduct. Energy flows into the system at every portion of its surface (although some sections are more "open" to stimulation than others) and it also flows out. The principal agency by which we affect things outside ourselves is the motor division of the organism.

Note how this rock-bottom fact is involved in every educational situation. A student cannot respond to the request to write a term paper without using his fingers to guide a pen, pencil, or typewriter in discharging this task; neither can the instructor present such a request orally without calling upon his tongue and throat muscles to convey the message. From the child's walking to the most eloquent speaker's oration, from infantile scribblings to the maturest drawings, and from the crudest hammering of the baby to the most refined manipulations of the surgeon, one feature stands out conspicuously, *viz.*, the complete dependence of these varied acts upon the motor control exercised by the individual. Our muscles are the tools by which we express ourselves, no matter how simple or complex the performance in which we are engaged.

Most of the mass of the healthy human organism is muscle. It is composed of living units known as *fibers;* when stimulated, they shorten and thicken, producing movements of the body and its members. On each side of the human frame there are about 400 *voluntary* muscles of all sizes and shapes. Every muscle of this type has an *origin* and an *insertion, i.e.,* the former is at a more fixed or central point of the organism and the latter is a more movable attachment toward the periphery of the system. Thus, if one " tightens " or contracts the large muscle at the front of the thigh by kicking the leg forward so that the part below the knee is in a straight line with the rest of the limb, it is possible to distinguish between the tendon at the high area where this muscle " begins " and the joint at the knee where the mechanical power of that muscle is applied. It is important to note that this simple act of straightening the leg is not done by this *rectus femoris* or the chief front thigh muscle alone, but by the balanced contraction and relaxation of numerous co-operating muscles.

**We influence the world through our effector organs only.** Through these muscles man does what is called " work " — there is no other method by which he can accomplish anything. The subtlest labors of a so-called brain worker and the most strenuous exertions of a runner in the 100-yard dash share this in common. Of course, the mus-

cles alone are not exclusively responsible for what the system achieves; it is inherent in the concept of organismic regulation that the heart, lungs, and central nervous system (to mention only the more obvious "controls") should also be participants in every motor accomplishment, since they simultaneously limit and make possible the performance.

As the only way our organisms can influence each other or act upon the nonhuman environment is by means of movement, it is a bit strange that relatively little educational theorizing has emphasized this principle. Motor activity is the sole method by which the individual becomes a positive force in the events that he witnesses. Indeed, the identification of all *behavior* with incipient or actual muscular expression, while probably not literally correct, is psychologically a "good error," *i.e.*, an insight based upon a recognition of relations that are of primary validity and significance. It will not do to scorn this outlook as one that reduces all that is distinctively human to a series of "muscle twitches" any more than the sensory structures can be dismissed as providing only concrete stimuli about the field in which the creature is living. Man, to be sure, is more than a specialized system of energy intake and output; but whatever view one takes of his organism, the effector apparatus must be prominently represented if the position adopted is to have any correspondence with the observed realities.

## THE INTEGRATING MECHANISMS

The preceding discussion will have been quite misleading if the reader is thereby disposed to maintain that the body (at least to the extent that the psychologist is concerned with it) becomes intelligible as soon as one views it as a bearer of specialized receptors and certain effector combinations. Between the initial and the final stages of any identifiable sequence of events centered about the human organism there intervenes a third, and in most respects the principal, portion of our natures, *viz.*, the central nervous system. External forces do not just impinge upon the sensory areas, transmit themselves

without modification through a homogeneous medium, and emerge in the shape of some movement (or inhibition of action) by one or more muscles. Instead, they are subjected to various degrees of transformation by the brain, spinal cord, and the autonomic and sympathetic nervous systems, all of which act upon the incoming excitation not only in terms of their own properties, but also as conveyors of influences already present or converging more or less simultaneously from other parts of the organism. Man's body is the seat not of merely one occurrence at a single moment of time, but of many coincidental and occasionally conflicting happenings. To direct and harmonize them in the interests of the entire organism is the great unifying function of the brain and its related neural structures.

**The nervous system as a unifying agency.** Man's brain possesses its present appearance and functions because of a long history of biological evolution. In a sense not wholly humorous, the brain is literally a swelling at the end of the spinal column. Man — before he became "human" — was a vertebrate, and in such organisms the neural tube along the back is the principal correlating center. Our spinal cord is now only an 18-inch tail to the far more massive and intricate structure that was originally no more than a few of its segments. The cerebral hemispheres, by a process of increasing centralization, won a dominant position in the total bodily economy; indeed, there is reason to think of the rest of the living system as merely a digestive, locomotor, reproductive, and manipulative annex to the cortex. The nervous system took the millions of separate cells which comprise each person and welded them together into a coexperiencing and a coacting individual, just as some great statesmen may have made nations out of a heterogeneous mass of discordant individuals.

Our relationships with the environment and control of it are primarily a result of the highly developed and mature nervous system which we now have, although it should not be forgotten that this co-ordinating structure was itself produced by long ages of interaction with the stimulus world. It grew as a meeting place of various nerve paths converging from and diverging back to all regions of the body;

despite its extraordinary ramifications it forms a continuum from beginning to end. The neurones themselves are highly differentiated cells whose chief task seems to be the binding together of all other units of the living creature so that something like a coherent and integrated organism emerges. The blood stream which carries nutriment to all tissues and cells also serves to unify the body by making the same general chemical contents equally available to all organs, and the ductless glands, which act on sectors remote from themselves through the blood, are also co-ordinators of considerable importance. But the organism becomes and remains a *whole* rather than a sheer aggregation mainly because the nervous system (to which the sense organs also strictly belong) acts as its central administrative or governing agency.

## INTERDEPENDENCE: THE BASIC ORGANISMIC PHENOMENON

Sensory receivers, reacting segments, and organizing centers — these three are the minimum essentials required before behavior of any sort can appear. None can operate by itself to create conduct; instead, they seem to obey the co-operative principle of " each for all, and all for each." The human body is a true *gestalt* or systemic entity since events which occur in one part have effects at points remote from the region of origin. Tickle a man's foot and laughter occurs in the facial area, five or six feet away. Extract a single tooth and the alignment of all the rest is disturbed. Burn a child's finger and the finger alone does not curl back from the danger source — the entire arm and body, *i.e.*, the child, are withdrawn. Under certain conditions, a word uttered into a person's ear will cause his hand to write, light shining into his eyes will make his foot press a brake, a blow on the back will clothe his face in either pain or joy. Events do not remain localized at the point where they strike the organism but radiate with varying degrees of completeness throughout the system.

This spread of energy throughout a " vessel " designed to make every part of it aware of what is happening elsewhere is a prerequisite to behavior that furthers the life interests of the organism. Even

such a simple reaction as scratching — a process which the great neurophysiologist Sherrington has investigated with comic exhaustiveness — requires a sensory report to the central nervous system, an arrangement of impulses at that locus, and some appropriate muscular response involving the facilitation and inhibition of an extensive set of effectors. The process is roughly portrayable in this fashion:

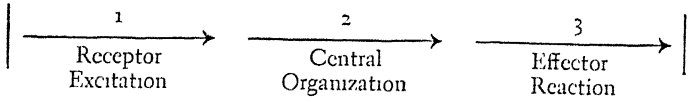



FIGURE 5

As soon as process 3 is ended, another receptor function which we may call 1′ occurs leading to 2′ and 3′; this weaving back and forth between the two ends of an indefinitely repeatable series of "triads" is the substance of human action. That is why, from one point of view, life is just "one thing after another." It should be noted, however, that the behavior stream with which psychological observation necessarily begins, can be structured in another legitimate way, to wit:

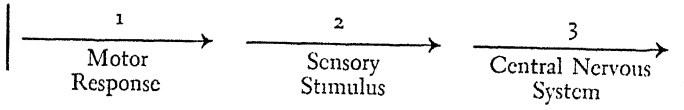



FIGURE 6

Since the process is actually a continuous and unbroken sequence, there is no more reason for starting with one part of this neural "trinity" than with any other. Each aspect of the organism's doings is equally real; what one sees is a flow of energy with a discernible (if somewhat imprecise) beginning, middle, and end. From the introspective standpoint, many units of behavior (in which goal awareness and purpose seem to be "primary") look like this:

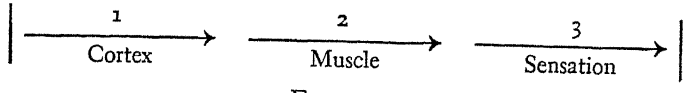



FIGURE 7

In any situation, it is clear that there are these three distinguishable components in every behavior unit. This is the machinery of all human action, and the groundwork of all conscious experience. Educational psychology, like all other branches of psychology, takes its departure from these inescapable and permanent features of the learner's organism.

## SUMMARY

The education of a human being is largely an effort to change the number of things that his body can do. One therefore needs to know what this organism is like from a purely descriptive or broad biological view in order that the material about which teaching and learning activities are centered can be appropriately manipulated.

A child's body is all that the child possesses. Similarly, the properties of an adult are the properties of his organism, and not of some nonnatural substance or entity which is *in* the body but not *of* it. This in no way diminishes the value of a personality to others or reduces the complexity and subtlety of the behavior that men exhibit. It does mean, however, that fostering the integrity and fullest development of the learner's organic nature is the soundest means of expressing the benevolence and humanitarianism which are the attitudes initially responsible for the provision of educational facilities for the young. The growth of the fertilized cell is a key illustration of the general principles of human development that must be utilized in furthering the more intricate adjustments of maturer life.

Educational psychology must know how to take advantage of the three features of man's system that are of greatest importance for his culturally significant behavior, *viz.*, his sense organs, his motor equipment, and his co-ordinating nerve centers. Deficiencies in any of these basic structures limit in various ways the behavior of which the organism is otherwise capable. All our conduct is dependent upon (1) some means of registering and conveying energy changes which occur within the system or the field that contains it; (2) some agency for unifying and organizing these impressions or for establishing and

guiding the objectives of the personality; and (3) some instrument, or instruments, for acting upon the environment in a way that promotes the well-being of the individual or the species to which it belongs.

There is no need at present to arrange these items in an order of importance since it is obvious that the organism is dependent for its origin and continued existence upon these and many other forces *jointly* operating to produce and to maintain the living body. Human life as we know it is not possible without the sun, the presence of certain atmospheric conditions, the availability of food and water supplies, and a number of other physicochemical circumstances that appear to have been found on the earth's surface for some time. In a very real sense, therefore, our organisms are transformed solar energy; the insight of certain ancient religions in worshipping the sun as the origin of all terrestrial being remains valid in the light of the best contemporary understanding of ourselves. Our bodies are not self-contained affairs, but products of Mother Earth that persist by virtue of continued interaction with "her" and by maintaining tight cohesion within themselves. Separating hairs, nails, skin, and even limbs from the person does not ordinarily mean his dissolution; but without brain, heart, lungs (the so-called vital tripod), and certain glands, the organism cannot survive as an organism, although it may continue as something else. The central fact of integrated behavior achieved by highly differentiated cells is the basis upon which modern psychology rests.

### PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Why is a dualistic view of the nature of the human organism unacceptable to most contemporary psychologists?
2. Name some of the *obvious*, as well as some of the more *subtle*, consequences of an educational program built upon the exclusively bodily character of the person.
3. Are there any important individual or social values that appear to you to be jeopardized by a pedagogy that acknowledges the body alone as real?

4. Point to a few features of growth which support the view that this organic process results from a constant interaction of inner and outer conditions.
5. State and illustrate the principle of differentiation as a general developmental law.
6. Does the elemental role of the sensory processes in all biological adaptation make concrete experiences indispensable to all education? Justify your answer.
7. What sanction does the "activity" school idea as a pedagogical movement receive from the relative importance of the musculature, and the effector or response phases generally, in our bodily economy?
8. Analyze any simple act of co-ordination that you see in yourself or others and show how the central nervous system plays a critical role in the process.
9. Are there any educational principles which trace their origin directly to the impressive interdependence of the different structures and functions of the organism?
10. Behavior, as this chapter has shown, runs a triple course through the "impressive, repressive, expressive" phases of the reaction cycle. Can you identify the educational philosophies which stress one of these three sectors at the expense of the other two? Would a system that is adequate in both theory and practice necessarily embrace all three aspects of conduct?

# Chapter 4

## THE LIFE CYCLE

Education is the provision of favorable developmental conditions for a living creature with a definite beginning and end. It must accommodate itself to the nature of the organism by recognizing that there was a time when the individual was not and that sooner or later there comes another time when he will no longer be. The phenomena to which educational psychology is restricted occur within the temporal limits established by the life span of the human species. There are no psychological events before a living creature develops and they cannot be found after he dies. Mental processes are just one of the many activities associated with the life cycle of a distinct personality.

A knowledge of *whence* a person comes and *whither* he is going is of fundamental importance to a proper treatment of him. The cumulative record chart or blank is an important part of systematized progressive-school practice, because it is recognized that the biography of the pupil is indispensable for sound educational guidance. Wherever possible the past of the learner should be known (at least in its relevant outlines) in order to help shape his future course more intelligently.

Every single human life follows a common growth pattern. The more familiar one can become with the main features of this developmental sequence, the deeper the insight one achieves into the behavior of children and adults. Age factors, or the changes that manifest themselves with the sheer passage of time, are the *ultimate* controls of our conduct. The organism has often been compared to

a clock that is wound up at birth in preparation for running an indefinite, but not too variable, number of years. A somewhat different, but perhaps more helpful, figure compares the course of an individual's life to a ball shot from a cannon and describing a trajectory or path that looks roughly like the one shown in Figure 8.

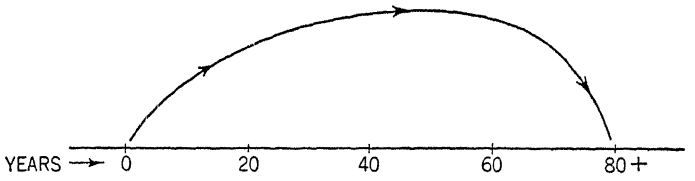



FIGURE 8

Historically, educational interest and effort have been concentrated upon the first quarter of the normal life span. The prolonged infancy so prominent a characteristic of man as an animal is primarily responsible for this traditional emphasis upon the first two decades of life as the period in which the adult personality is established. In large measure this is an inevitable consequence of the laws of growth and nothing in the foreseeable future is likely to change this situation, although the educational possibilities of middle life and even advanced years are today more fully realized than has hitherto been the case.

## OUR PRENATAL BEHAVIOR

If we set as the task of this chapter the tracing of the life cycle from start to finish, we must review from a different standpoint some of the facts presented in Chapter 3 in which the origins of individuality were considered. On that occasion we were primarily concerned with stressing the exclusively bodily nature of the human being; now we are interested chiefly in following the course of that body's adventures from the time it starts its career until it ceases to be "human" and becomes something else.

The story begins not with ourselves but with our parents. All human body cells have 48 chromosomes, a fact which sets them off

from other animal cells which have a different "count." Our reproductive or germ cells, however, undergo a curious division so that every egg created in a woman's ovaries has only half this number, *i.e.*, 23 + *x* (this 24th chromosome is known as the "sex" chromosome). The sperm cells that "ripen" in a man's testes similarly have just 24 chromosomes, except that they are of two equally numerous types, *viz.*, 23 + *x* or 23 "pairs" + *y* (the *x* and *y* represent the different sex chromosomes). Apparently the differentiating factor which ultimately produces a male or female child is contained within the germ plasm of the father; the mother's protoplasmic contribution may be thought of roughly as indifferent or sexless human material. During fertilization the chromosome number is restored to the normal human complement or complete number of 48; one then gets either (46 + *x* + *x*) or (46 + *x* + *y*), the 2*x* pattern becoming a female child, and the *xy* combination a male. The same odd chromosome that determines sex may coincidentally determine many other traits because of the existence of sex-linked characters.

How much of our destiny is sealed at the moment of conception is difficult to determine with any accuracy, and it is this uncertainty which has given rise to the interminable disputes concerning the relative importance of "heredity" and "environment" which we shall consider in another section of this volume. Of one thing, however, we can be sure: The anatomical organs and allied physical characteristics associated with the structural differences of the two sexes are completely determined 270 days (on the average) before birth. Whether one's future activities are to be limited by the possession of a male or female body is a question that seems to be settled right at the beginning; but to determine whether one will, on the sole basis of what is present at fertilization, become a bright or a dull adult is a far more doubtful matter.

The activated egg is a minute blob barely 0.13 mm. in length, but within 30 days it has grown to 6 mm., or ¼ inch, 50 times its original size and 8,000 times its weight. Not all of the fertilized ovum becomes the body of the baby: The *outer* part or trophoblast is a nutri-

tive mass that anchors the egg to the wall of the uterus; and of the *inner* portion only the double-layered embryonic disk is converted into the cells of the human infant, the rest becoming the amnion and yolk sac, which disappear after a time like so much scaffolding that has become useless when the structure has been erected.

**Qualitative and quantitative aspects of embryonic and fetal life.** At the end of the second month the basic plan of the human organism has been established. During this month we grow sixfold in length (from 6 mm. to 35 mm.), and about 500 times in weight.[1] A recognizable human creature has now been formed. Technically, this is the end of the *embryo* stage of uterine existence; thereafter the unborn child is termed a *fetus*. During the third month the skeletal structure is laid down in accordance with a highly significant developmental principle to which we shall frequently have occasion to refer. That is, growth takes place from the larger center outward: Arm bones appear before hand bones, leg bones before foot bones, and the backbone before the ribs. The face grows together or "closes" from both sides, since man (like most vertebrates and mammals) is approximately a bilaterally symmetrical organism with left and right paired organs. Individuals with hairlip or cleft palate (with consequent defective speech) are those in whom this closure has not been fully completed — they represent a minor case of arrested embryonic growth. Missing parts or doubled and multiplied parts are also due to similar irregularities in the formative process.

It is not necessary for our purposes to sketch even the main features of later fetal life such as the straightening of the body axis and the abandonment of the forward curvature of the embryo, the elaboration of sensory and motor structures, and the "rounding off" of the finer architecture of the nervous system, particularly the brain. At five lunar months, the fetus is about a pound in weight and a foot in length. By this time, too, it possesses the 12 billion or more nerve cells that constitute the adult human nervous system. The fetus of seven

[1] See Margaret Shea Gilbert, *Biography of the Unborn*, Baltimore, The Williams & Wilkins Company, 1938. The figures in the preceding paragraph are also derived from this useful source.

months can survive in the extra-uterine world, but apparently human organisms born before that time do not possess a sufficiently mature co-ordinating mechanism to keep them alive. It is a mistake to assume that the child is ever "complete," for his organs are always pointing to some stage beyond that which they exhibit at the moment. For example, neither the tear nor salivary glands are complete at birth; the neonate consequently can cry, *i.e.*, make noises with his throat and mouth, but he can hardly weep until the lachrymatory fluid is available.

As far as behavior of direct psychological or pedagogical interest is concerned, it must be admitted that the unborn child exhibits surprisingly few responses that can be turned to educational purposes. The fetus occasionally blinks its eyes, hiccoughs, and swallows a small amount of the amniotic fluid in which it floats; it moves itself about regularly in small "daily exercises" following the fourth month, executing these changes of position by large-muscle innervations, although it also succeeds in producing smaller localized twitching reactions. Experiments with prematurely born babies show a modest variety of approaching and withdrawing responses — the fundamental dual form by which living creatures become adjusted to energy forms about them. These positive and negative reactions can also be modified, indicating that true learning can occur in some form at this stage. However, the fact that certain behavior can be elicited from the fetus outside the womb does not mean that this occurs inside, since the uterine environment is extraordinarily simple and homogeneous in nature, the amniotic fluid permitting next to no stimulation other than that of vibration or a jarring impact and allowing nothing but minimal postural adaptations within a rigorously confined space. Reports by pregnant women indicate that the fetus is quiet or motionless most of the time; the total amount of "action" does not exceed an hour even shortly before birth. Changes in the mother's posture evoke compensatory reactions in the fetus, and radio noises and loud conversation often make it "kick" vigorously. More than this rarely takes place.

The human fetus is in some ways more like a sessile plant than a

free-roving animal, and its experiences are correspondingly meager. Indeed, the humble shellfish that lie in the mud on the river bottom or ocean bed have a richer environment than the unborn child since the changing water currents alter the content of their immediate surroundings. None of the great events of uterine life have left any imprint upon our conscious memory; it is not that we have forgotten them — they simply were never registered. Such extraordinarily important occasions as the detailed shaping of the eyeball and the emergence of the thumb take place and leave no vestige upon the nervous system of the organism of which these structures form a part. We come into being, assume human form, and grow in size and complexity all without any self-knowledge of what is happening to us. Mature life also shows that these fundamental biological changes go on with little awareness on the part of the individual involved, but the mystery is never so great as at the start.

## THE ACT OF BIRTH

The expulsion of the child from the body of the mother is effected by vigorous contractions of the muscles in the wall of the uterus assisted by the pressure exerted by the external musculature in the pelvic region. The child's head usually emerges first; some time after the body is completely outside, the afterbirth — the placenta and the membranes with which the fetus was connected — is expelled. Since the fetus has been dependent for its nourishment upon the blood stream of the mother (accomplished by way of the umbilical cord), this connection must be broken if the new-born creature is to assume the semi-independent life of early infancy. Consequently every adult bears in his umbilicus — essentially a small abdominal scar — a reminder of his early parasitical state.

Many psychologists have been impressed by the dramatic events associated with human birth and have built a number of fascinating theories concerning its significance for the developing personality. Thus, the Freudians and other psychoanalysts have assumed that the child experiences the birth process as a severe psychic shock or

"trauma," that he therefore resents and rejects the implication of the event, and that he consequently seeks to be rejoined to the mother so that he may enjoy the warm and quiet hospitality of the womb. Regression to a simpler and more primitive state is thus felt to be a desirable condition; the fact that the individual is forced to grow to higher levels provokes a protest against the reality which he cannot reverse.

**Probable psychological meaning of birth to the individual.** This is a stimulating and inviting suggestion, but it is essentially an untestable hypothesis. There is no question that the neonate finds this literally a *cold* world, at least by comparison with the body-temperature milieu of 98.6° F. whence he has just come. But the cries which follow delivery are more likely due to the stimulating effect of cool air upon the lung passages and to other mechanical factors than to any embittered objection to being torn from a pleasant and comfortable setting! The probabilities are that the birth act as such is much more significant to the parents and attendants than to the primitive creature who is thus forcibly launched on his extra-uterine career.

It is difficult to know which is the greater evil in interpreting the meaning of the birth event, overemphasis upon its "shock value" to the infant or gross minimizing of its significance for the organism. The social custom of celebrating birthdays probably contributes to an exaggeration of the significance of the date of delivery as actually all of us are almost one year older than our method of computing age leads us to believe. This is a sort of "constant error" resulting from our inability to do more than estimate the approximate time of fertilization, a method for reckoning which, with our present imperfect objectivity of attitude, is paradoxically and simultaneously both too personal and yet too impersonal. So far it seems that both laymen and scientists have magnified the significance of the birth act, partly because of the frequency of maternal mortality formerly accompanying childbirth and partly because of the emotions associated with the appearance of the new generation. That birth does produce some strained condition in the baby may not only be presumed from the

pressures and squeezing to which it is subjected during labor, but may also be inferred from the slight loss in weight which is a normal phenomenon during the first week of extra-uterine life, although some of this results from the reduced nutritive intake pending the establishment of milk in the mother's breasts. Severance from the mother's body deprives the child of its customary food supply which is not quite balanced by the little nourishment it receives during the first few days of separate existence. On the whole, this sharp shift in environment does make some, but not very severe, demands upon the adaptive powers of the human frame; it probably corresponds to a sudden change in weather, climate, or altitude level for the adult for which he is at first unprepared but to which his physiological mechanisms rapidly adjust. It is doubtful if normal birth is comparable to anything more dramatic than a pronounced change in barometric pressure and general atmospheric conditions.

## AGE CLASSIFICATIONS AND THEIR MEANING

If one follows closely the developmental pattern presented by the human being, one significant generalization is forcefully impressed upon the observer, *viz.*, that it takes time to grow. Growth as an elemental fact of nature then assumes, and never loses, its place as one of the key concepts of educational psychology. As new qualities and reactions appear in the amazing sequence of days, months, and years, the psychologist finds himself acquiring a sense of time that in some respects is akin to that of the historian and in others to that of the geologist. He is witnessing the process of Man becoming man. Some of the reactions through which this occurs can be hastened by favorable stage setting, or retarded by other conditions, but many of these responses come forth in a fixed order that can neither be hurried nor blocked by any methods now known to us. There is a *shape* or *pattern* — both favorite terms of genetic psychologists — to these transformations of behavior which must be perceived before the nature of the child is even partially understood.

According to Gesell, the attainment of normal maturity at age 24

makes it possible to divide the cycle of growth into a succession of four well-defined stages of about six years each, as follows:

1. The preschool years (0 to 6).
2. The elementary years (6 to 12).
3. The secondary-school years (12 to 18).
4. The preadult years (18 to 24).

Notice that this grouping is far from a wholly "natural" one as it is based upon the peculiar institutional practices of American society, with respect to the treatment of the young. Nonetheless, the ending of the preschool period is marked fairly precisely by the eruption of the sixth-year molars, the ending of the elementary period by the appearance of the physical signs of puberty, and the ending of the secondary period by the approximate attainment of one's full height. Each of these periods can be further subdivided. Such groupings, however, are of less general psychological significance than is the fact that identical or comparable principles of growth and guidance hold for fetus, child, and adolescent alike. The infant, the toddler, the run-about, the school beginner, etc., represent true differences in independence and mastery over situations, but the methods by which this has happened remain essentially the same at each level.

**Upward extension of educationally significant periods.** Contemporary educational psychology no longer considers its genetic task done when it has traced the development of the child to man's estate. The merging of the last stages of youthful growth into adulthood does not mean an end of the psychological problems of skill, achievement, attitude, and information, but a forward projection of them to more stable and higher planes of accomplishment. Educational psychology exists wherever the teacher-learner relation obtains; and in our culture and time this is practically coextensive with life itself. Schooling is no longer exclusively a matter of girls in their teens assisting youngsters to acquire the rudimentary symbols of civilized intercourse. For some decades educational officials in their seventies and gray individuals pursuing graduate studies have compelled a

chronologically upward extension of the groups with which the psychologist is concerned. Even on theoretical grounds, the necessity for viewing the life cycle in its entirety cannot be evaded as no one period is really intelligible without some reference to that which precedes and that which follows. It is consequently desirable to add to the four stages of the growth cycle these later periods:

5. The years of early maturity (25 to 45 or 50).
6. The years of later maturity (45 or 50 to 65 or 70).
7. The years of senescence (65 or 70 until death).

## THE FIRST YEAR OF LIFE

If a baby is laid upon its back as soon as it is born, the spontaneous behavior that then occurs is quite limited. A healthy, normally formed baby will kick or wiggle its legs, make slashing movements with its arms, turn — but not lift — its head, shift its eyes about, engage in various mouth actions, and that is about all that is open to ordinary inspection, apart from the obvious drinking, eliminating, and breathing that occur. Compared to what the baby could do earlier, its behavioral repertory at birth is relatively rich; compared to what it will be able to do a few months later, it seems pathetically handicapped and restricted.

If the neonate is made the subject of some simple experiments, then of course a wider variety of behavior than is "freely" manifested can be elicited. Mild mechanical, chemical, electrical, visual, auditory, vibratory, tactile, and other types of stimuli have been applied to every accessible portion of the neonate's body. The responses that occur, while simple and elementary "reflexes" for the most part, do reveal that the neonate has a wider set of possibilities for varied reaction in himself than initial inspection appears to indicate. This neonatal period is considered to close with the end of the fourth postnatal week when the stump of the umbilical cord is finally separated from the abdominal surface; the little "belly-button" wound inevitably associated with birth is healed by that time or even sooner.

Apart from the always interesting physical attributes of the infant,

notably as these contrast with or resemble the same features in the adult, the most significant fact about the young infant's behavior is the "law" which seems to govern his development. As in other vertebrates, the direction of his behavioral progress is from head to foot. Thus, the sequence of motor patterning is roughly: lips, head, eye muscles, neck, shoulders, arms, trunk, legs, and lastly the feet. Presumably, the head end of the body differentiates first and at a faster rate than the rest; it has, in other words, a higher growth potential. Nearness to the brain, the organizing center of the organism, probably accounts for this basic phenomenon. The brain has literally a "head start" over the other parts of the body, for no other organ finishes its developmental cycle so soon. At birth, the brain is about half of the adult size, and by age six it has completed 90 per cent of its total growth. A comparison with the feet or other organs shows that they lag much behind this "pace setter" of the human frame.

**The four major features of conduct.** The first year of life exhibits a steady and progressive increase in the complexity of action of which the infant is capable. To order the many miscellaneous things that are done, specialists in child study have found it helpful to group their observations into the following four grand categories of behavior:

1. Motor development.
2. Adaptive (*i.e.*, discriminative or intellectual) development.
3. Language development.
4. Personality and social development, *i.e.*, character, interests, etc.

Of these, the easiest growth curves to trace are those involving physical skill and control. As soon as he is born, the infant can and will orient himself toward broad areas in his environment. A few days thereafter the eye muscles can be co-ordinated to follow the movement of smaller objects held in its field of view. Horizontal movements apparently are easier to follow than vertical ones, for the former (such as watching a fly crawl across a table) can be done at about two months of age, but it seems to require another week to manage the latter. Circular movements can be followed a fortnight later. The deeply significant use of the thumb in grasping objects

begins to appear about the fourth month, although it takes most of the remaining months in the year to perfect the ability to oppose the thumb to the other fingers in seizing things. Somewhere between the fourth and fifth month the normal infant starts to reach for objects held before it. Note that the refinement process in these cases proceeds from a gross general orientation of the organism toward the situation, followed by successive stages of adjustment, each more specific, definite, and exact than the preceding one. The growth process throughout is well symbolized by the difference between response to a *mass* and response to a *point*, the latter reaction ordinarily coming later than the former.

" Intelligence " in the human infant is an attribute that appears in nearly all of the things he does and not just in a restricted group of acts peculiarly designed to exhibit it. Any improvement in learning, regardless of what the content learned may be, is properly construed as evidence of intellectual development. Simple " associations " give evidence of an expanding mental horizon, such as ceasing crying when a bottle of milk is brought in sight, laughing when a familiar " squeak " toy is shown him or when he hears his parent's voice. One baby at five weeks used its hand to wipe away the excess boric acid that it felt in the corner of its eyes. This act per se is entirely appropriate and may be construed as evidence of direct or primitive perception of relations. This same youngster at ten weeks deliberately struck a tin cup containing a spoon, apparently in order to enjoy the resulting " sound effect." This active search for new stimuli to apply to itself is one of the best signs of that exploratory curiosity which is such a universal symptom of enlarging intelligence.

The language or speech development of the human infant is one of the most interesting aspects of his nature. His first vocal efforts have little or nothing to do with any attempt at deliberate communication with others — they are sounds that just accompany pain, hunger, fear, anger, a state of contentment, or the feeding act. " Syllables " like " uh," " ah," " la," " er," " urr," " oom," " bing-ga," " ou-wah," and others can be detected by the careful listener by the end of the

third month. This is the state which some specialists call language "form" without language "function"; the reverse relation is also encountered. The first time "mum-uh" is uttered, it probably has no personal meaning, despite the illusions entertained by many parents on this point. As with domestic animals, the child clearly shows signs of "understanding" what he hears long before he is able to use these same words himself, e.g., one baby at six months opened its mouth when told to do so and reacted correctly to the direction, "Take my finger." This response, of course, is present in many forms of adult behavior, such as our ability to interpret more or less correctly material in a foreign tongue without ourselves being able to initiate these expressions.

Socialization of the infant and the formation of his personality are closely parallel operations. Despite the understandable tendency of chronological records of child growth to report *average* dates for the appearance of specified types of behavior, it must never be forgotten that there is considerable variation around these means or "norms" and that every action pattern involves the expression of an increasing amount of *individuality* as the child grows older. Persons who are not intimately acquainted with infants are inclined to say all babies look and act alike, just as prejudiced or ignorant people occasionally (and for them, rightly enough) declare that all Negroes or Chinese look alike. This, of course, is due solely to a level of motivation in perception that is insufficient to reveal finer differences. A bluish-green surface is one that is primarily green with a tinge of blue; a greenish-blue surface is one that is mainly blue with a shade of green in it; and it is only hasty observation that fails to make the proper discrimination. A parallel situation holds with the young of the species. Most people react to an infant as "a cute white baby" rather than as the distinctive individual "John Arthur Smith," age 39 weeks, thereby subsuming the particular under the general identification. To be sure, the overt differences among small children's personalities are less impressive than among adults, because the process of maturing involves an accentuation of individuality. None-

theless such individuality is present even in the neonate to eyes that are trained to look for its "earmarks." It manifests itself a bit later chiefly in the frequency and intensity of certain emotionalized reactions to things and persons, such as smiling, "fussing," playing, amount of bodily activity, elementary "interests," and gross insights into simple relationships among objects. This individuality as manifested in a relatively stable performance pattern constitutes the principal identifiable factor of permanence amidst the changing functions of the child's organism.

## THE WALKING-TALKING STAGE

The most impressive events in the months following the child's first birthday center about the ability to walk and the power of speech. These two basic skills confer "human" status upon what has hitherto seemed like a prehuman creature. Their appearance marks the end of the most "helpless" period of infancy and the beginning of a stage of relative independence. Without the power of locomotion the organism is confined to its immediate locality and must trust a very limited spatial environment for the satisfaction of its needs. Even the young baby normally enjoys being carried around and shown different scenes — apparently there is a real delight in a moderate amount of fresh sensory stimulation which the adult retains in his interest in travel. As soon as he can walk, his exploratory desire is freed from its earlier dependence upon adult service and the corresponding capacity to do what he wants himself is greatly enhanced. This increase in "self-reliance" is facilitated both by the child's desire to do that which he now finds himself able to do and by the customary encouragement that elders give to these efforts. The assumption of an upright posture confers a new visual perspective upon most things and by its association with the walking act broadens enormously the range of possible experience for the growing organism.

Effective oral communication, which usually matures shortly after the act of walking, marks an even more dramatic extension of the child's sphere of interaction with the surrounding world. Language is man's most distinctive and amazing tool for controlling himself

and the natural order about him. When the child starts to talk he is to some extent undergoing a second birth, for it is only as he begins to *communicate* his experiences to others and to *understand* theirs that he is truly assimilated to the psychological world of the family and neighborhood. This step makes possible the child's participation in the culture and his absorption of the essence of the social heritage in a way that no other achievement of his can ever match.

The emergence of the walking act comes at the end of a period of about 15 months of preliminary growth in general motor control, accompanied by a marked increase in muscle tonus. During the first three months after birth the ability to hold the head erect steadily improves and the child's torso musculature gains in power to turn the body from back to side and *vice versa*. By about the sixth month he can roll completely over and pull himself to a sitting position with a little aid. Between nine months and a year, the baby usually starts to creep on its hands and knees. This prestanding stage often displays many odd and amusing variations of the crawling process, notably that involving hitching along in a sitting posture — the method known to the Pennsylvania Germans as "rutschen." By about the first birthday, standing alone without clinging to support is possible for a brief period. When the fifteenth month arrives, most children succeed in walking across a room independently, perhaps with feet spread widely for better balance; hereafter, the ease and distance covered improve swiftly. Each stage — the sitting, crawling, standing, and walking period — is clearly separated from the others, and the transition to the next succeeding level occurs with noticeable rapidity following a "latent" period during which the preceding stage is apparently being perfected.

**Phases of speech development.** The acquisition of speech, like that of walking, is essentially a motor accomplishment involving principally the tongue and mouth musculature. It is, however, a more intricate act as may be seen in its close dependence upon auditory perception. A deaf child learns to talk at a much later date and in a quite different way than the child with normal hearing. In part this is due to the deaf child's inability to hear his own sounds and to com-

pare them with the "models" that adult speech provides, thereby approximating his own rendering to that of others by spontaneous self-correction. The learning of oral language is a clear instance of the operation of a social norm, dependent for its maintenance and transmission upon a "correct" or approved sensorimotor reproduction.

True speech seems to rest upon a foundation of vocal play, *i.e.*, an activity in which the young, healthy, rested, and contented organism apparently produces sounds solely for the satisfaction of making and hearing them. These are to be distinguished from the more affectively toned cries that accompany general excitement of any kind and which seem to be expelled quite involuntarily. Between three and six months, vocal control takes the form of "babbling," *i.e.*, repeating the same sound over and over. The first sounds are few in number, but during the next quarter year they gain in variety. One six-months-old girl baby succeeded in lengthening her vowels with a tonal effect, presumably in imitation of her mother's slow singing. Language comprehension improves during the next half year, although it is important to stress the fact that the inflected phrasing rather than the specific words seems to be the medium that conveys the meaning.[1]

[1] This suggests very strongly that single words are later isolated from larger massed patterns of sound which preceded them. An approximate equivalent to the child's experience may be seen in one's own efforts to understand conversation in a foreign tongue. To one unacquainted with the language, natives seem to speak much too fast, largely because one is unable to separate out the detailed terms.

The power of an inflected sequence to convey simple associative meanings or directions for actions appears in the apparent ability of dogs and other animals to understand what their masters say to them. They do not comprehend the significance of the separate terms in the sense that an adult human does, for the same instructions given in sharply altered inflection cause confusion and failure to respond properly.

One German child who could point correctly to the window when asked, "Wo ist das Fenster?" reacted similarly when asked in French, "Où est la fenêtre?" Presumably he could do this only because the intonation was the same and because the syntactical structure of this particular interrogative sentence is identical for the two languages.

During the last quarter of the first year the infant usually builds up an extensive gesture language in which finger pointing, pulling with the hands, head shaking, and other simple signs are employed. Some children at their first birthday can say a dozen or so words very clearly, but how much meaning goes with them is uncertain — probably little. The real gain in speech ordinarily sets in between the twelfth and the eighteenth month, by which time he is usually familiar with a great many nouns and a few verbs and adjectives. Short spoken sentences like "Where did it go?" are also possible about this age, although what are called "word sentences" have antedated this for some months.[1] By the time the normal child has reached the age of two years, his basic vocabulary suffices to express most of his existing wants.

## THE PRESCHOOL PERIOD

The interval from two to six is a time for consolidating the really extraordinary gains made before the second birthday, plus the use of these fundamental skills in investigating the social and natural world. Questions continually arise designed to promote his understanding of the countless phenomena of which he has now become aware. Memory functions improve sharply, finer finger manipulations become possible, the emotional and intellectual life increases in richness, social responses and playmates grow in personal importance, sustained conversation with adults is now possible, the speed and accuracy of most processes concerned with self-management become greater — all evidences that the baby state has been left far behind. Although all of life is one grand and continuous process of socialization, *i.e.*, of inducting the individual into the life of the group and its ways of doing things, the nursery school and prekindergarten years are

[1] A word sentence in child psychology means that when a child says "doll," the total complex of meaning that he is aiming to convey may be, "Please, auntie, see my pretty doll." This highly compact symbol is not a result of the child's effort to condense the separate terms, but it is due to his present ability to use at least one crucial term and his concomitant inability to convey orally the finer shades of the remaining thought unit.

pre-eminently the years for assimilating the essential and routine aspects of the culture.

**How "writing" develops.** Specialists have traced the growth of various features of child behavior by repeated observations of the same personality at different stages of its development. Their educational import is much greater than seems evident at first sight. An excellent example of this procedure and the findings to which it may lead appears in the following careful analysis of the genetic record of the unfolding of the power to manipulate writing tools:

The motor maturity of a child is revealed in the manner in which he uses objects as tools. One of the most revealing tools is the writing instrument in the form of crayon or pencil. A sheet of paper is placed on the table before the child, and a pencil or crayon with its sharpened end pointing away from him is then placed on the paper. The observer notes the manner in which the child picks up the pencil, adjusts it for writing, and operates it.

At *1 year,* the child can deftly grasp and manipulate long slender objects, such as a spoon or rod, with the finger tips. However, when he attempts to utilize the objects in poking, tapping, or brushing, he resorts to a more primitive and firmer grasp, holding the shaft enveloped in the palm. This type of grasp is also used on the crayon with its point projecting out of the radial aspect of the hand. The child wields the crayon by banging or brushing with a full-arm action in which lateral movements predominate. He raises his hand high and on lowering it frequently misses the paper and marks the table top.

At *18 months,* the child picks up and grasps the crayon with its butt end held firmly in the palm. He draws the point of the crayon across the paper largely by shoulder movements which raise the elbow upward and outward and lower it downward and inward. These movements alone determine the tilt of the crayon and cause it to be raised on the outward sweep. Banging is giving way to marking which is confined mostly to the paper. Scribbling is spontaneous at this age and is performed with great vigor in imitation of the examiner. The child for the first time makes definite strokes and differentiates between stroking and scribbling.

At 2 *years*, the child picks up the crayon by placing the thumb at the left of the shaft and the fingers at the right. He adjusts the crayon for writing with the aid of the left hand. Palmar gripping is giving way to awkward attempts to extend the radial fingers toward the point of the writing instrument. Some infants hold the butt of the crayon against the palm of the hand with the index finger extending down the shaft. Others hold the crayon crudely in the adult manner with the medius near the point and the index and thumb flexed sharply but higher up over the shaft. Writing pressure is exceedingly variable and scribbling movements frequently occur in which the crayon fails to contact the paper. The child definitely rests his hand on the paper in writing and confines his marks pretty well to the paper. Although his hold on the crayon is firm, he is beginning to manipulate the pencil with the fingers, and thus makes smaller marks than he did at 18 months. He can imitate vertical and circular strokes.

Children appear to take a peculiar interest in finger movements as early as 2.5 *years*. They restrict the size of their drawings and engage in activities such as stringing beads, building with blocks, and making writing movements in imitation of their elders.

At 3 *years*, the child picks up the crayon as he did at 2 years. In writing he simulates the adult hold by resting the shaft at the juncture of the thumb and index finger. The medius extends with its tip near the point of the crayon while the thumb opposes the index finger higher up on the shaft. There is a definite inhibition of large arm movements, as well as increased use of the fingers.

*Four years* represents the transitional stage in picking up the pencil. The child now places the index and medius at the left of the shaft and the thumb at the right. On lifting the pencil, he rotates its point under the palm toward him and adjusts it, sometimes with the aid of the left hand, for writing. In all cases the pencil is held with the tip of the three radial digits near its point with the medius more fully extended than the others. The paper is held in place by the left hand. The pencil is firmly gripped and moved by flexing and extending the fingers, although wrist movements are present. The writing is usually small and cramped. However, he handles the pencil with much greater facility than at 3 years and draws a much rounder circle. He can copy a cross and also trace the diamond path without committing more than two errors. He still has difficulty in drawing lines in the diagonal directions. In this connection it has

been found that increase in accuracy of tracing is greatest between 3 and 4 years, and that children of 3 to 6 years experience about as much difficulty in tracing in one direction as in any other. Four years is definitely the formative age in graphic representation. The child is beginning to represent objects in the way they appear to the adult. His drawings of a man may be crude but they have features which clearly identify them.

The *5-year-old* child is quite expert in handling the pencil. He plucks it from the table as he did at 4 years but with greater ease, and on raising the hand, revolves the point of the pencil clockwise in the manner of the adult and at the same time adjusts it for writing. The writing hold closely approximates that of the adult. The radial surface of the extended medius supports the pencil near its point while the thumb and index are applied at varying positions on the shaft. Marks made on the paper are generally confined to a small area. The child can now draw easily recognizable forms. He is quite adept at copying a square with pencil or with pen and ink. He can copy a triangle and trace the paths of the diamond and the cross without error. His fingers are much more nimble than they were at 4 years and he handles the pencil more adaptively and with greater precision. His control of finger movements is such that he will soon be writing.

The *6-year-old* child grasps and adjusts the pencil as he did at 5 years. His writing hold is similar to that of the adult, with the thumb and index flexed slightly more than the medius. Writing is accomplished principally by movements of the fingers and wrist and, as at 5 years, is confined to a small portion of the paper. The trend of his slow and labored movements is from left to right.

In summary it may be said that the course of development in writing is proximodistal. The gradual decrease in the size of writing movements with age is paralleled by corresponding reduction in the number and magnitude of superfluous movements.[1]

The progressive elaboration of behavior illustrated with a single function in the foregoing extract can be duplicated with almost all

[1] From pages 89–91 of *The First Five Years of Life*, a Guide to the Study of the Preschool Child, from the Yale Clinic of Child Development, by Arnold Gesell and Associates, New York, Harper & Brothers, 1940. Quoted by permission of the author and publisher. *The Modern Baby Book and Child Development Record*, by John Anderson and Florence Goodenough, New York, W. W. Norton & Company, Inc., 1929, is an extremely useful technical diary of the type that should be kept by every serious student of human behavior.

of the remaining processes that can occur in the human organism. Before long the child is literally capable of thousands of different things. No really exhaustive inventory can be compiled because the number of items to be recorded is limited only by the number of possible stimuli (or situations) available in the physical world and the capacity of the observing psychologist to react to the differences that confront him. No one has ever taken a subject, seated him comfortably in a laboratory, and then passed the whole world of nature before him to see what he did in response to each changing scene. Since such a task is impossible, scientists are restricted to *sampling the universe* of possible behavior rather than itemizing the whole of existence. We do not know, for example, what all the three-year-old children in the world would see if placed upon the top of the Eiffel Tower and asked to describe the landscape below. The human cost of securing this extensive information would probably not be justified by the outcome. Instead, we balance the value of this bit of knowledge against other personal and social values, contenting ourselves with data pertaining to the responses of a dozen children and substituting the Empire State Building as an observation point instead of the Parisian structure on the assumption that the essentials of the experience will be revealed by this more economical and convenient functional "equivalent."

**A cross-sectional picture of mental evolution.** Information secured in this more restricted way gives a picture of expanding child conduct roughly schematized by the following composite time table: [1]

TWO YEARS

*Motor and Manipulative Skills*

*a.* Runs
*b.* Piles six blocks
*c.* Imitates vertical or horizontal strokes
*d.* Tries to make a circle
*e.* Nests four boxes

[1] From *Child Psychology*, pp. 135–136, by George D. Stoddard and Beth L. Wellman, 1934, by permission of The Macmillan Company, publishers.

*Comprehension*
- *a.* Places blocks in row to make train
- *b.* Points to five objects on a card
- *c.* Creases paper in imitation
- *d.* Explains pictures
- *e.* Points out objects in pictures
- *f.* Obeys simple commands
- *g.* Unwraps paper from candy

*Language*
- *a.* Uses words in combination

*Social Behavior*
- *a.* Tells experiences

THREE YEARS

*Motor and Manipulative Skills*
- *a.* Traces a square

*Comprehension*
- *a.* Points to parts of body
- *b.* Gives family name
- *c.* Names objects in pictures
- *d.* Gives sex

*Immediate Learning (and Problem Solving)*
- *a.* Repeats six-syllable sentence
- *b.* Repeats two digits
- *c.* Repeats three digits

*Language*
- *a.* Names three things in a picture
- *b.* Names familiar objects

FOUR YEARS

*Motor and Manipulative Skills*
- *a.* Copies a square

*Comprehension*
- *a.* Compares two lines
- *b.* Comprehends simple situations
- *c.* Discriminates seven geometric forms
- *d.* Counts four pennies
- *e.* Gives sex

*Immediate Learning (and Problem Solving)*
- *a.* Names pictures from memory (immediate recall)

*b.* Repeats four digits
*c.* Repeats twelve-syllable sentence

FIVE YEARS

*Motor and Manipulative Skills*
*a.* Copies a square
*Comprehension*
*a.* Counts four pennies
*b.* Compares two weights
*c.* Forms rectangle from two triangles
*d.* Defines common objects
*e.* Performs three commissions
*Immediate Learning (and Problem Solving)*
*a.* Repeats ten-word sentence
*b.* Repeats tapping order (three taps)
*Language*
*a.* Names primary colors

It should be emphasized again that the successive stages here given represent a generalized picture of the American child of "middle-class" parentage as seen by researches made since 1920. That the normal developmental history of most prospective school children is thus correctly represented need not be doubted; what must be stressed, however, is that *this sequence is not a rigid or necessary one for every child at all places and at all times.* Individual variations in responsiveness to the constitutional compulsions of the underlying time factor in growth are but part of the explanation for the many departures above or below the norm; gross and subtle differences in the nature of the physical and cultural environment in which growth occurs as well as differences in the interest and competence of elders in promoting the optimal development of the young are crucial forces determining the kind and rate of change observed.

## THE ELEMENTARY-SCHOOL YEARS

The years from 6 to 12 are in many ways a great biological riddle. It is a bit hard to see why nature, *i.e.*, the complex results of past evolution, should act in such a fashion that the human species is

incapable of even physical reproduction until about the twelfth birthday or beyond. In fact, the chemistry of the system is such that many of the glandular secretions act as " brakes " or inhibitors of too rapid growth in certain directions, as though nature were afraid that her ultimate plan for the human organism would be wrecked if certain sectors of the bodily economy moved ahead too fast. The later years of childhood, therefore, seem like one long latent period in which adulthood is apparently suppressed in order that the cultural opportunity of prolonged infancy may be fully utilized. It is, of course, unwise to attribute " purposes " to nature when all she may be really exhibiting are necessary " processes " or inevitable outcomes of prior conditions, but man has capitalized this basic fact about his own organism, *i.e.*, his infantile helplessness and incompetence, and made it the foundation for introducing his young to the past history of the species as this appears in the world of " ideas." Even if there were no institution such as the elementary school, the years it spans would almost certainly be devoted to the learning of the basic skills characteristic of the group. This can be deduced from the use made of this period by primitives. The child must be oriented in the big world of time and space, and prepare himself to meet the demands it makes upon him if he is to survive on a satisfying basis.

Such is the deeper personal and social meaning of entry into school. It is preceded by an increase in responsibility which makes possible the transition from the relatively protective atmosphere of the home to the more self-reliant life of the school, which in turn fosters the growth of this important characteristic. Games and vigorous play occupy the child's attention during most of his " free " or unsupervised time, indicating that his principal interests are met by the informal and less institutionalized random associations of daily life. Friends become more indispensable than hitherto, but toward the middle of this period the work of the school and its associated activities become the definite center of the child's life — a second home, in fact.

**Interdependence of school and home.** This point is of consider-

able importance, for many problems in mental hygiene and social adjustment rest upon the nature of the relations developed in this sphere. It is the judgment of many guidance experts that a child's total adaptation may be considered favorable, (1) if he is out of rapport with the folks at home, but "succeeds" in his school life, and (2) if he finds school a source of irritation and frustration, but is able to depend upon his domestic contacts for "security" and stability in a puzzling world. One institution, consequently, may serve to counterbalance the defects of the other so far as meeting the personality needs of the child is concerned. If, however, (3) neither home nor school provides the youngster with the satisfactions he implicitly seeks, then the unhappily maladjusted individual or "problem personality" is likely to be produced. Such a disastrous outcome must be prevented by every means available. The time to forestall the emergence of a chronically thwarted creature is in the elementary-school years — the earlier the better. The child's need for affection and understanding is usually insufficiently recognized and poorly met by psychologically illiterate parents and teachers. While the machinery for linking home and school agents in a common effort to further the interests of the child is still far from adequate, there is no question that (4) the youngster is best able to realize his values when he and his family group and the school personnel are all moving in the same direction.

On the whole, that part of the life cycle which covers the elementary-school period — about one-tenth of the average American's longevity span — acquires its principal significance from the experiences of the child in connection with the "subjects," skills, and problem situations that the classroom provides. These are the things that most deeply stimulate him and determine his "status" in the company of his equals in age. Since the school has tended to enlarge rather than to diminish its contacts with other community activities and enterprises, this fact tends constantly to assume greater importance. The doings of the "gang," church affairs, incidental travel, the vivid and dramatic stimuli of the film, press, and radio all win

some share of the child's responses, and may be decisive in forming certain segments of his nature. The school nonetheless stands out as the most impressive, continuous, and influential factor in the normal experiences of later childhood.

## CHARACTERISTICS OF ADOLESCENCE

It is customary to distinguish three phases in the process of achieving sexual maturity: the prepubescent, the pubescent, and the postpubescent, sometimes called early, high, and late adolescence, respectively. The principal features of each are basically determined by specialized changes in the anatomy and physiology of the growing organism; the psychological changes that occur simultaneously or shortly thereafter seem to be secondary manifestations of the important and fundamental alteration in the bodily economy involved in the new chemical balance created by the reproductive fluids now pouring into the tissues. The subjective sense of being a male or a female is strongly intensified. Ever since the age of three or earlier, the individual has been aware of the fact that he is either a boy or a girl, but no very marked sex differences in behavior appear during the preschool or most of the elementary years. As soon as puberty sets in, the world is sharply divided into masculine and feminine and normally remains such until the life cycle draws to its end.

For most children, adolescence can be said to start by the seventh grade, the age level considered to begin the junior-high-school period. The familiar physical "signs" of incoming hair under the armpits and about the pubes are symptoms common to both sexes. Some doubt has recently been shed upon the popular lay and professional assumption that girls mature in this and other respects earlier than boys, an uncertainty due in part to different biosocial standards concerning the "readiness" of the respective sexes for mating and in part to the clinical difficulty of ascertaining exactly comparable and homologous events. The onset of the first menstrual flow is unambiguous and may frighten the girl needlessly unless she is properly prepared for the occasion. The "flat" chest of female childhood

gives way to the conspicuously rounded, mobile breasts of youth, the newly prominent hips, and an apparently slenderer waistline. These are all functional preparations for prospective motherhood and are constantly visible structural changes.

With the boy, on the other hand, the pubertal alterations do not occur as swiftly or as obviously. The drop in his voice to a lower octave does not happen overnight. His penis and testicles grow larger, but the presence of the "androgenic" hormone and the first flow of sperm are not readily ascertained without constant urinary analysis sustained throughout the period under observation. Dominance as a personality trait grows somewhat in proportion to the number of sperms or other biochemical content discharged. It is quite likely that the apparent adolescent retardation of boys would be greatly reduced were a more exact biological chronology employed. In practice, however, no matter what the detailed reasons may be, there is little doubt that most adolescents and young adults require about two years' age difference between the sexes for optimum personality interstimulation to occur.

**Ego responses of this period.** The self of the youth matures rapidly and in new directions on the basis of these thoroughgoing bodily transformations. The possession of a larger frame — in many cases bigger, more attractive, and physically more efficient than those of parents and other elders exercising supervisory authority — fosters an occasional sense of equality or even superiority with respect to others. The feeling, however, cannot be long maintained with full confidence because it clashes too plainly with other evidences of immaturity and lack of self-sufficiency. Unevennesses in personality growth often stand out sharply and contribute to the embarrassment and uncertainties of the adolescent. He encounters the many irrationalities of the social system into which he must fit, and frequently he must struggle long and hard before his vocational and other roles in life are settled satisfactorily.

Adolescence is usually deemed a difficult period of life, but it is probably such only because our modern industrial culture converges

upon the pubescent youngster with a hypercomplex set of compelling stimuli while at the same time it denies him the means or the opportunities for gratifying the needs thus aroused. The result is a sharp struggle for self-control, a prolonged strain upon the organism's inhibitory powers, and a chronic condition of mild thwarting at best. For some years, therefore, the organism is in a state where its reach exceeds its grasp. A moderately neurotic condition of hyperirritability ensues, whose every symptom indicates that it is a " disease of civilization " produced by heaping too many and too severe problems of adaptation upon the living system within too short a span of time. The *Weltschmerz* of the social-minded and intelligent adolescent illustrates this predicament of frustration to perfection. His peculiar emotional state is less of a riddle now than formerly, perhaps because many well-adjusted adults are now similarly disturbed by the disintegration of much of contemporary society.

In the United States a full description of the phenomena of adolescence is now equivalent to the psychology of the secondary school, since two out of three youngsters of high-school age are today enrolled in that institution. Consequently, much of the intellectual and emotional life of puberty has to be considered in connection with the expanding horizon created by the scientific, literary, artistic, economic, and historical stimuli contained in the curriculum of the seventh to the twelfth grades, inclusive. Here is found much, but not all, of whatever it may be that shapes the adolescent's mind. The past and the future both become more real. An attitude of yearning based upon a vague perception of present incompleteness is intensified.[1] Comprehensive ideals for one's self and for the world

[1] This may be based upon a dim recognition that inherently each sex as such is an unfinished thing and needs the other to round out its experience — an awareness that is often resisted because it clashes with the strong desire for full independence. In addition to this factor, there is an unformulated sense of the succession of the generations, the brevity of the life span, and the necessity of becoming something or doing something to justify one's existence. Wholly apart from the expectations of others, this becomes the matrix out of which both general aspirations and specific ambitions develop. The adolescent now sees that everything points beyond itself and he becomes increasingly preoccupied with the meaning of *all* experience. When this becomes central to his adjustment, the religious or philosophical interest emerges.

now appear as a means of structuring more definitely the cloudy outlines of the years ahead. The high vitality of this period is often expressed and intentionally dissipated in aimless but vigorous pleasure hunting, yet beneath these trivialities is a fairly earnest effort to focus the organism's energies upon some large continuing enterprise of more permanent value.

## THE PERIOD OF YOUTH

In ordinary speech, the term "youth" is employed loosely as an antonym to old or middle age, and may be applied to persons anywhere between 12 and 40 years old. In more technical discussion, a narrowing of meaning becomes desirable. The American Youth Commission in order to define more exactly the population with which it was working considered as a "youth" any individual between his sixteenth and twenty-fifth birthday. This was a somewhat arbitrary interval, dictated largely by the necessity for including within its survey scope those persons who work for a living after finishing the junior high school. For our purposes, a closer adherence to the existing educational ladder seems justified, even though most individuals at present lie outside of it. The years of "youth" in the narrower sense will therefore be taken to embrace the usual college and professional-school period, the years 18 to 24 when occupational preparation and apprenticeship are clearest.

For most purposes, this interval of life may be construed as a prolongation of adolescence. Indeed, some critics have looked upon our collegiate system as an artificial scheme for extending its immaturities and retarding normal development! Youth is undoubtedly like adolescence in its retention of uncertain, tentative gropings for a life purpose; its partial or total economic dependence; and in the disturbing and insistent nature of the sex interest. It differs, however, in the greater stability of emotional reaction; in a more masterful adjustment to the requirements of social intercourse; in the less random focusing of its abundant powers upon major and persisting problems; and in the consciousness that one's physical reserves are at or near the maximum. The mood of youth is one of healthy

expansiveness, compared with which adolescence appears in a somewhat sickly light. The imaginative functions begin to glow less brightly or with more restraint (in this sense, adolescence may be the true peak of human experience), but "common sense" and an appreciation of "practical" realities are much greater. Some youths have already grown cynical about others and themselves, but most retain an optimistic outlook upon their affairs.

The undeniable central interest of youth is a job. Identification with a certain type of career is usually well established toward the end of this period. If all goes well and the possibilities of a regular and sufficient income emerge, the largely exploratory courtships of the preceding years give way to a serious concern with marriage and the establishment of a home. Male and female youth differ slightly in the degree of emotional involvement on different issues at this time, but the essential pattern remains the same for both men and women.

## EARLY AND LATER MATURITY

The relatively long stretch between 25 and 65–70 are the years in which most of the world's work is done. This is the period for production and achievement, the interval in which man must make whatever contribution he has to offer to the culture that has reared and sustained him until this moment. What specific form this shall take is a function of many forces, but the general path of later development is usually clear to both the individual and to others by the mid-twenties.

The nature of the organism makes it possible to split maturity into two halves, approximately separated by the 45–50-year dividing line. This point may be chosen because it marks the termination of the female's reproductive possibilities; and while there is grave scientific doubt whether anything exactly comparable to the menopause takes place in the male, since his power to fertilize may remain unimpaired until advanced old age, this point also may be taken as the gradual beginning of a certain amount of organic involution represented by

circulatory changes, susceptibility to fatigue, diminished resistance to degenerative diseases, and other symptoms of lower vitality.

The two decades between 25 and 45 are for most adults the period of home building and the time in which the individual carves out a definite niche for himself — or is assigned one — in the community structure in which he is found. Most of the important decisions concerning religious, political, and social life have usually been made, confirmed, or accepted by the beginning twenties, but the assimilation and translation of these viewpoints into organizational behavior ordinarily occur later. The individual falls into or actively creates the details of the composite pattern of life that he considers "good" or at least possible for himself. If he achieves what is usually called "success" in the crucial economic sphere, he normally develops a contented outgoing personality, provided his health and domestic or erotic adjustments remain adequate; if, on the other hand, he thinks of himself, no matter what the justification, as a "failure" or as one who just manages to survive in the competitive struggle for fame, wealth, power, and other symbols of social acceptance, he is in danger of becoming a "shut-in" or unhappy personality. As with school children in their subjects, the person in the forward-looking decade of the thirties must experience the sense of getting ahead toward his chosen goals, whatever these may be, or suffer the bitterness of thwarting, not in minor affairs, but in the central values of life. Where too many cases of serious blockage exist, the community or nation as a whole must initiate steps to remove their causes whether these lie within or outside the individual organism.

The two decades following the psychobiological "watershed" around 45–50 are much more resistant to summary characterization. Both men and women reach their maximum weight between 50 and 60. Both sexes occasionally rouse themselves to renewed learning efforts in an attempt to keep abreast of developments accentuated by the presence of a new and vigorous generation in their midst. Ambitions grow more modest, the retention of simple and familiar comforts becomes one of the chief objectives, and provisions for impending

retirement and for old age receive earnest attention. The individual is usually at the pinnacle of his social influence during these years, for the apex of business and professional prestige comes — if it comes at all — during later maturity. The power and authority now enjoyed tend to be used for conservative ends, partly because these are the only goals that seem legitimate and partly because a skeptical hostility to the aims of the younger groups is thus asserted. The recurring antagonisms of age and youth rest upon a foundation of mutually exclusive experiences, both equally valid for each group, and capable of resolution only by a more egalitarian sharing of effective power. During the fifties, the nature of American social organization and his own declining vigor often place the individual on the defensive, a situation unfavorable for the manifestation of generosity and conducive to a resurgence of callous selfishness save within the circle of intimates. Never is it more necessary to distinguish between the behavior which man as a bodily organism *must* display and the behavior which man as a social animal *may* reveal. In most cases where we dislike what we observe in ourselves and others, directional changes leading toward more valued states remain open.

## SENESCENCE

Old age does not start at any clearly defined point because it is a complex set of conditions and symptoms, and not determined by a single criterion or sign of its presence. However, most human organisms, after they have been active for about 65 to 70 years, give evidence of moving into a period that differs from any hitherto experienced. The individual tends to feel that life has run its course. He ceases to strive for the attainment of any grand objectives. The death of many of his contemporaries — friends, rivals, associates, and relatives — turns his thoughts toward his own inevitable dissolution and evokes moods of appraisal about his own past. He drifts along in an intensified routine fashion, restricts sharply the interests that earlier concerned him, and often exhibits what may loosely be described as a waiting or expectant attitude.

Intellectual deterioration of some sort invariably is manifested, although with gifted persons this may be postponed until the eighties. The first mark of senility is a noticeable forgetfulness or inability to retain recent impressions. Although new learning modifications equal to that of elementary-school children are biologically possible, the individual's motivation for acquiring them is seriously impaired — he typically asks, " Why acquire what will endure for but a few years at most? " Both posture and gait betray the physical and mental weakness of tired old age when the organism finally surrenders its efforts to reshape the world and is resigned to the irresistible powers of all-encompassing Nature. These and other attributes betoken a state of getting ready to return to the earthly reality, variously portrayed, from which the individual dimly recognizes he originally came. With this half-intellectual, half-emotionalized state of preparedness, the organism is equipped to greet its own death, not with a sense of tragic frustration as would have been the case earlier, but with an awareness that this final and culminating act of the life cycle belongs to the " acceptable " order of the universe.[1]

## A SAMPLE BIOGRAPHY: LOUIS PASTEUR

One of the best ways of sensing the significance of various aspects of the life cycle and of specifying the principles of personal development is the critical analysis of the individual history of an eminent individual. The only important distinction between the " case history " of an ordinary citizen and the biographical record of a more illustrious creature is that the behavior of the latter is judged to have greater significance by the community or the opinion-making portion thereof. It is not our purpose here to inquire into the validity of the various tests for determining a truly famous man, but to illustrate the manner in which *any* life history can be considered in the light of the " seven ages of man " outlined in the foregoing. Many figures

[1] The reader should be reminded again that this sketch of the life span is confined largely to the *modal* human being, and therefore by implication leaves ample room for the numerous exceptions to the general developmental trend that unquestionably occur.

from different spheres of activity throughout history could be chosen for this task, but the name of Louis Pasteur, the great French scientist, will do as well as any.

Pasteur was born in the provincial town of Dôle in 1822, where his father was a tanner. Soon thereafter the family moved to Arbois where the boy went to school until about sixteen. His infancy and childhood reveal little of importance to the psychologist that could not be recorded for countless other children. No "genetic studies of genius" were then in process to satisfy the curiosity of a reverent posterity. Louis was classified by his teachers as slightly better than average, but his elders did not consider him brilliant. Perhaps he was too "quiet" a boy to create any other impression. The director of his secondary school, however, seems to have discerned his future promise, and urged Louis to consider going to the famous *École normale* in Paris, the great teacher-training institution for all France. In the fall of 1838, the young Pasteur tried to follow this suggestion by going to a special preparatory school in the capital, but the tension of metropolitan life affected his health and made him so deeply homesick that he had to return to Arbois to recuperate. (Note the characteristic strains of adolescence in this.)

His ambition to enter the highly selective *École normale* had meanwhile been heightened and he went to the equivalent of a junior college in Besançon to better his qualifications. In 1840, he obtained from this institution what the French call a "Bachelor of Letters" degree, and was made an assistant in mathematics there — clear evidence that his intellectual powers were maturing and winning recognition. Two years later he passed the "Bachelor of Science" examination which made it possible for him to become a successful candidate for admission to the cherished *École normale.* Oddly enough, a note was attached to Pasteur's diploma declaring that he was only "mediocre" in chemistry — which may have been true enough and a factor possibly responsible for the invigorating compensatory efforts soon to be made in Paris.

Apparently it was during these strenuous and uncertain years of

later adolescence and early youth that the dominant controls of Pasteur's life were established. A motivational trinity recurs in his correspondence of this period: Will, work, and success — but the greatest of these was work. This became the center about which his entire personality was organized.

From this time on, Pasteur's history is literally studded with brilliant academic and professional achievements. He began the serious study of chemistry, became a laboratory assistant, and proceeded to solve complex problems in biochemistry which had hitherto resisted the efforts of Europe's ablest scientists. This led to his appointment as Professor of Chemistry at the University of Strasbourg, following which he married happily. His researches in acid reactions of industrial importance brought about a promotion in 1854 to the post of Dean of the Science Faculty at Lille, where he explained his own discoveries by the aphorism, " In the field of observation, chance favors only those who are prepared." Following this, his experiments with acid-producing micro-organisms conclusively disposed of the old doctrine of spontaneous generation by this important generalization: " The chemical act of fermentation is essentially a correlative phenomenon of a vital act beginning and ending with it." The medical application of this principle that a " sterile " liquid free from " invisible " germs does not putrefy soon revolutionized surgical practice and brought untold blessings to the human race.

Pasteur emerged victorious from the scientific controversies surrounding his findings, was covered with honors domestic and foreign, and was called to a high post in the *École normale* in Paris — this last unquestionably a fitting pinnacle to his early ambitions. This did not result in a waning of his activity, for his motto of perseverance, " Always work," still ruled his system. In 1865, he was persuaded to investigate the silkworm blight which threatened to ruin an important national industry. After a few months of close scrutiny and experiment in the field, he was able to announce the cause of the disease and the methods of preventing it. This growing mastery of bacteriology enabled him to perfect the now familiar technique of at-

tenuated virus administration which cut the cholera death rate among chickens from 10 to less than 1 per cent. A similar triumph with the inoculation and immunity procedure was scored in the case of cattle and sheep anthrax. Huxley, the great English scientist, declared that the short-term money value of these livestock discoveries alone was more than sufficient to pay the entire indemnity paid by defeated France to Germany after 1871, *viz.*, one billion dollars. Pasteur's only reward was the acclaim of his contemporaries and the personal satisfaction in his own skilled activities which he expressed in these words: "There is no greater charm for the investigator than to make new discoveries; but his pleasure is heightened when he sees that they have a direct application to practical life."

The remaining years of Pasteur's life were devoted to his favorite researches in preventive and curative medicine, an occupation that is all the more remarkable when one considers that he was never trained as a physician. His most conspicuous success here was the development of the hydrophobia antitoxin for combating this dread disease of both dog and man, achieved about 1885. He was the master of the critical or controlled experiment. Thus, a number of dogs were inoculated, the same number left untreated, and both groups were then bitten by rabid animals. All the "immunized" dogs lived, but all the rest died of rabies. The extension of this principle to saving the life of a nonimmunized human by remedial or attenuated dosages of the virus involved is one of the most daring and humane episodes in the annals of mankind.

After fifty years of solid achievement, this great benefactor of the species died in 1895. The constructive values that guided him during the fruitful decades of his mature life are most briefly revealed in a simple but eloquent passage from his address at the occasion of the founding of the public Institut Pasteur in 1888: "Two opposing laws seem to me now in contest. The one, a law of blood and death, opening out each day new modes of destruction, forces nations to be always ready for the battle. The other, a law of peace, work and health, whose only aim is to deliver man from the calamities which

beset him. The one seeks violent conquests, the other the relief of mankind. The one places a single life above all victories, the other sacrifices hundreds of thousands of lives to the ambition of a single individual. The law of which we are the instruments strives even through the carnage to cure the wounds due to the law of war. Treatment by our antiseptic methods may preserve the lives of thousands of soldiers. Which of these two laws will prevail, God only knows. But of this we may be sure, that science, in obeying the law of humanity, will always labor to enlarge the frontiers of life." [1]

## SUMMARY

This chapter has involved a lengthy piece of stage setting for what is to come. Nonetheless, an impossible task has here been attempted. The English historian Gibbon spent the better part of his days producing his monumental *Decline and Fall of the Roman Empire* — its *rise*, he recognized, was too much for him to include. How much less possible of fulfillment is a portrayal of the myriad features which characterize the behavior of the human organism — the creator of all empires — from the time of its inception to its termination! But just as there is room for a one-volume account of a nation's history as well as the more exhaustive ten-volume "giant," so a useful function is discharged by even a chapter devoted to the basic job of defining the temporal outlines of human experience.

Consider once more the ground that has been traversed. The life of every person is something that moves or flows from initial stages (to which the adjective "human" — at least in the honorific sense — is rarely applied) to later periods distinguished by important differences in both appearance and conduct. Each individual is the seat of a multiplicity of natural processes and events. His "life" — if it can be thought of as something other than "him" — is both a result and a cause in this time series. The dependence of contemporary forms of life upon earlier ones is clearly seen in the birth process

[1] See the classic biography by Vallery-Radot for further details. The short account by Roscoe in the 11th edition of the *Encyclopedia Britannica* is also good.

itself and in the manifold sexual and protective activities of adults. This biological continuity is a fact of paramount importance for education, since it is the major condition upon which its own being as an aspect of social life depends.

To offer a summary of a summary until the quintessential substance of the human life cycle appears in a crisp formula may not be a wholly unprofitable task, but there is little real need to try it on this occasion. Enough if we emphasize that change of state is constantly occurring at the same time that there is a persistence of a recognizable "sameness" throughout. To grasp this relationship in its comprehensive totality is difficult, but literary biographies and the more clinical or scientific case histories facilitate the effort to see the elusive whole that governs the parts upon which our eyes normally come to rest.

### PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Does the life cycle in all human beings who live until advanced old age follow essentially the same developmental pattern? Give your reasons for answering as you do.
2. Outline a technically feasible plan for determining whether any form of learning can be accomplished during the normal prenatal period of the individual. This assumes the presence of the intact fetus within the uterus, a factor limiting the "accessibility" of the young organism to be studied.
3. What does the birth process suggest, if only by way of rough analogy, for the general theory of "change" of any kind in human affairs? Does institutionalized education commonly operate in accordance with these implications?
4. It is often claimed that every teacher ought to be a parent in order to know what the "raw material" of the school is really like. What are the detailed presumptive gains referred to here? How do you appraise these alleged contributions of biological motherhood or fatherhood to the practice of pedagogy?
5. Specify a few of the main features you would include in a nursery-school curriculum designed to meet the needs of children between their second and fourth birthdays.
6. Certain critics of the American elementary school maintain that

it is one or two years too long for maximum efficiency in furthering mental growth. Give the psychological basis for this opinion, whether you share it or not.

7. Present some of the psychological considerations which make it possible for some theorists to hold that the human being is at his "spiritual" best in high adolescence.
8. Why has "youth" become a national and even international concern of governments within the last decade or so? Does an explanation solely in terms of economic barriers satisfy you?
9. Prepare a brief psychobiography of some favorite hero whom you have "worshipped" and try to account genetically for the particular pattern of behavior which he exhibited in mature life.

# Chapter 5

# THE FIELD OF EDUCATIONAL PSYCHOLOGY

## A. *Sample Problems and Specific Facts*

In the preceding chapters we have sought to define a point of view toward the central features of human behavior that appear in school life. This viewpoint cannot be rightly considered as merely one other opinion, possessing neither greater nor lesser validity than many outlooks of widely differing contents and implications. It is offered as a position that does justice to the available facts and values which can pass critical inspection *now*; if, as is highly probable, new data and changed circumstances compel a revision of this " system," then of course the viewpoint must be correspondingly modified. But at the moment it is presented as an authentic reflection of the objective and verifiable realities at present accessible to the experiencer.

To say that there are as many psychologies as there are psychologists is correct in the sense that every scientist (like every human being) makes his own unique and specifically personal emphases. But the affirmation of one person's insights does not as such demand the negation of another's vision of existence. This is the mistake made by those who neglect the common factors in all living or who assume that every version of things is equally inadequate. Such is the error of *skepticism* which holds that human behavior remains forever unintelligible, or, in milder form, that (as Mark Twain declared in another context) we know a lot about man which isn't so. Historically, this skeptical attitude seems to have resulted from the disillusioning consequences of devotion to *dogmatism, i.e.*, a fixed body of beliefs which cannot defensibly be accommodated to new observations. The skeptic says that truth in psychology (or any other area) is unattain-

able, the dogmatist that this truth is found only in his orthodoxy and that all departures therefrom are falsehoods; a safer view seems to be that the truth in psychology is hard to achieve, that it eludes finding (appearing often in uncongenial garb so that it is unrecognized) or is often confused with its opposite, but that to those who work industriously, honestly, and thoughtfully some glimpses of the actual state of affairs are vouchsafed. Such an orientation cannot be achieved too early in any field, but particularly so in one which frequently leads to clashes with convictions treasured by the self or by others whom one respects.

A saying attributed to Cattell declares that "psychology is anything the psychologist is interested in" or, in one version, anything the psychologist *does*. This has the merit of catholicity and is obviously a reaction to those unlovely family quarrels in which certain psychologists denied that what their colleagues were studying could properly be termed psychology at all.[1] It is also in harmony with the recent tendency represented in the *operational* view of science to increase the concreteness (and simultaneously to decrease the load of abstract conceptualization) of every area of knowledge. This position is essentially a behaviorist approach to knowledge, arguing that the meaning of any term is equivalent to the operations it calls forth, *i.e.*, "significance" resides in what one does.

Consequently, one method — not the sole one, however — of describing the work of educational psychology is to present a representative list of topics about which educational psychologists concern themselves and how they think and write on these things that engage

[1] For example, in the opening years of this century, Titchener declared that the work of Thorndike could hardly be called psychology — it was interesting, useful, and important, but not *that!* Any extension of psychological inquiry to fields hitherto untouched thereby is still greeted with a similar response. Obviously, too *narrow* an interpretation of psychology is dangerous. Whether too *broad* a picture is equally so is likewise probable, although the exact dangers are still to be revealed. The present work favors the widest possible interpretation of the subject, not only on the ground that its human service is thereby increased, but also because its own growth is furthered by encouraging the largest number of reciprocal contacts.

their energies. Of course, it is not strictly true that "everything an educational psychologist does is educational psychology," since he is obviously not directly engaged in a professional or research capacity when sleeping, walking, brushing his suit, or doing the thousand and one other things that he shares in *common* with the rest of mankind. The *distinctive* task of the psychologist lies in understanding, predicting, and controlling human behavior in both its inner and outer aspects. The methods used for accomplishing this are wholly secondary. This specific job is particularized even further when the *educational* psychologist restricts his operations to those features of our conduct that are revealed in teaching and learning situations as they occur in, or are related to, the life of the school as it functions in contemporary America.

## THE VARIED CONTENT OF EDUCATIONAL PSYCHOLOGY

One of the best ways of getting acquainted with the content of educational psychology is to examine the periodical and book literature classified under that caption in the *Psychological Abstracts*, a professional journal devoted exclusively to short "noncritical" digests of all material with a psychological content no matter where found. "Educational Psychology" is one of the fourteen major captions employed in grouping the available references, although much that is directly pertinent to this area is included under the companion headings of "Mental Tests," "Childhood and Adolescence," "Learning, Conditioning, Intelligence, Attention, Thought," "Personality and Character," and "General Social Processes." The remaining eight rubrics are less intimately connected with the dominant issues of educational psychology, but as the following list shows, they are far from wholly irrelevant:

General (including Statistics).
Nervous System.
Receptive and Perceptual Processes.
Motor and Glandular Responses (including Emotion).
Psychoanalysis, Dreams, Hypnosis.

Functional Disorders.
Crime and Delinquency.
Industrial and Personnel Problems.

Although these 14 categories differ greatly in the number of titles appearing under each, it is a reasonable estimate that no less than one fourth or more than one half of all published material in the general field of psychology is related to the problems of educational psychology as these have developed during the twentieth century and particularly during the last two decades. Moreover, psychology alone is not the only source of growth in educational psychology; this is also facilitated by the vast number of hard-to-classify articles included in the *Education Index* and the *Review of Educational Research* which embrace an extraordinary variety of professional and "practical" themes (such as administration, finance, community relations, school architecture, curriculum study, subject-matter controversies, etc.).

To this must be added the important stimuli provided by the never-ending ferment within the social sciences, since political and economic problems arising out of conflicting personal attitudes are among the major questions of our time. Every phenomenon in educational psychology occurs within a definable social context, and the behavior of teachers and pupils under relief, depression, democratic, authoritarian, and war conditions, while not a part of the subject as it was originally conceived, has now definitely become incorporated within it. This development has been furthered by the general awareness that educational psychology lies both at the apex of the biological sciences and at the base of the social sciences (assuming both to have a pyramidal arrangement). Philosophic positions affecting the life of the schools, such as appear in the "essentialist," humanist-classical, Catholic, and "progressive-education" systems, likewise provide material to which the psychologist must respond, particularly since many of the issues center about conflicting interpretations of the nature of interest, learning, and personality organization. Finally, the transformations within subject-matter fields themselves eventually

influence the work and thought of the educational psychologist: For example, physics has been revolutionized by relativity within a generation, and ecology is practically a new creation within biology.

On the advanced-research levels, psychology has probably received more than it has given to other disciplines, but on the levels of secondary and elementary instruction, the relation seems to be reversed as in the multiplication of such specialties as the psychology of arithmetic (or algebra), the psychology of the language arts (reading, spelling, writing, etc.), the psychology of music, and the "psychology" of every major school subject. To work effectively in these distinct areas of professional education, social organization, philosophic outlook, and technical fields, the psychologist must be extraordinarily receptive to such aspects of these situations as lend themselves to fruitful treatment by him. Banality and superficiality often result from his first efforts to deal helpfully with this broad domain of human relations, but this is not a necessary or a permanent characteristic of his activities.

## REPRESENTATIVE STUDIES

Let us examine a few samples of current work. Reference No. 1560 in the March, 1940, issue of the *Psychological Abstracts* reads as follows:

> Bunting, J. R. Counseling alters pupils' choice. *Occupations*, 1939, 18, 174–176. — Original vocational choices of 375 10th-year students were not realistic in that too many of them were for the professions. After some group discussion and individual reading a larger proportion of the students were planning business careers, and the distribution of preferences became more nearly like that of available jobs. — H. SCHLOSBERG (BROWN).

Here we have a highly condensed summary of an attempt to deal adaptively with a common problem in American high schools. Apparently a small amount of specific instruction centering about their occupational preferences suffices to change the life purposes of many adolescent pupils. This is a fact of considerable importance to edu-

cational psychology since it shows that our goals as well as methods for reaching them are distinctly alterable. It is also noteworthy that the problem arose out of an economic situation in which supply-and-demand equilibrium in certain careers threatened to be disturbed. Whether the soundest solution is to discourage more young persons from attempting to become physicians in view of the great unfulfilled health needs of the nation and the higher median income of medical workers as compared with teachers is open to grave doubt. This is an intricate question of basic human values and the study of Bunting's cited above deals with an extremely small part of it. Both at the beginning and end of every typical inquiry, educational psychology is faced with the necessity of defining its relation to some social theory and a general philosophy of life.

Reference No. 1565 deals with another standard problem in the educational psychology of the elementary school, *viz.*, the nature and causation of disabilities in reading [1] by an expert in this area, Professor Walter F. Dearborn of Harvard, abstracted by S. A. Kirk of Milwaukee Teachers College. Numerous causes of reading disability are acknowledged to exist, indicating that a pluralistic interpretation of the phenomenon is the soundest. Dearborn nonetheless offers evidence substantiating his hypothesis that left ocular or manual dominance is found more frequently among retarded readers than among superior readers. In other words, a left-sided (*i.e.*, left-eyed or left-handed) person is more likely to have difficulty with the particular form of visual perception known as "reading." Here it seems that one is confronted with a condition primarily due to biological factors, but cultural forces are probably also operating. Since right-handed persons form most of the human population, they have created a right-handed world and the minority of 5 per cent or so who prefer to use the other side must accommodate themselves to this situation. Obviously, right- and left-handedness are an educational problem and one which affects not only motor adjustments but also remoter sensory and central processes.

[1] See *Supplementary Educational Monographs*, 1939, No. 49, 103–110.

For the college level, Reference No. 1582 is representative.[1] This article reports that advanced college students acquire about half of the special vocabulary of their subjects under ordinary class procedure, but as much as three fourths may be learned when definitely announced tests are used to motivate the acquisition of the vocabulary. Under an instructional program stressing vocabulary, but without the motivation of a testing schedule, freshmen master about 40 per cent of the technical words of a new subject. The higher the "native ability" (*i.e.*, intelligence level) of these learners, the greater the vocabulary range and the more marked the increase during college years. Apparently, too, vocabulary gain achieved by stimulation through a special teaching technique in a particular subject does not noticeably facilitate growth in the general nontechnical vocabulary.

These findings accord with earlier results in related areas. Examinations in our culture do seem to energize students so that temporarily at least they exhibit greater command of the material to which they have been "exposed." Brighter persons usually exhibit superior facility with verbal symbols, although there is something circular about this relationship, since many mental measures determine one's intellectual capacity by seeing how well one can handle words (and ideas conveyed by them). Indeed, so intimate is the association that the size of one's vocabulary — assayed by the number of terms correctly defined in a random dictionary sample of 50 to 100 items — correlates +0.90 with standard intelligence tests or almost as high as they correlate among themselves or nearly as well as the two halves of the same mental measure correlate with each other! As a child grows in word knowledge, he also grows in mental activity, and conversely. Somewhat harder to assimilate is the failure of "transfer" to manifest itself, *i.e.*, increased knowledge of terms in the physical sciences evidently does not lead to more interest in words in general. Difference in the implied goal of student effort probably

[1] W. B. Johns, The Growth of Vocabulary among University Students, with Some Consideration of Methods of Fostering It, *Journal of Experimental Education*, 1939, 8, 89–102. (Abstracted by H. W. Karn of Pittsburgh.)

accounts for this high specificity of response; if the aim was the direct enlargement of one's vocabulary in general (even though that purpose evolved in a specific content course) the "carry-over" could be expected to be greater than if the end sought was limited to the material of a circumscribed subject.

## TYPES OF INVESTIGATIONS

In the three studies just mentioned, our primary interest has been in the results of these inquiries and their interpretation. But results, no matter how significant, are notoriously a function of the methods used to secure them. Educational psychology is not merely a collection of pertinent "findings," but also a body of techniques for securing them. Data do not ordinarily emerge of their own accord — they must be obtained. Sometimes essentially the same results or generalizations emerge from widely different approaches to the same broad problem; occasionally conflicting findings are not really such but arise because different procedures have been used. The way in which a psychologist works is consequently as important as what he examines and discovers for the proper assimilation of his contribution to the existing body of scientific and professional experience.

**How differential liking for teachers affects selection of later course work.** A very simple device for securing the answer (better, *an* answer) to a recurring pedagogical problem appears in a paper by Stephen M. Corey and George S. Beery of the University of Wisconsin on "The Effect of Teacher Popularity upon Attitude toward School Subjects." [1] A "problem" of this sort grows out of one's acquaintance with student and faculty life in educational institutions and particularly with the facts of pupil-teacher and pupil-subject relations. Until the suggestion arises that a student's liking for some part of a larger course of study is affected by the nature of his reaction to the instructor in charge of this sector of school experience no "problem" for investigation is at hand. A farmer, a storekeeper, and a garage mechanic are not likely to see anything problematic in this

[1] *Journal of Educational Psychology*, 1938, 29, 665–670.

scholastic question because their own occupational contacts do not stimulate the formation of this kind of hypothesis, although they may evoke many others with a different content. It is known that pupils like or dislike certain subjects; it is also a familiar observation that students like or dislike certain of their instructors; what is not known is the nature of the connection between these kinds of liking. Because *some* kinship rather than no kinship between these phenomena is assumed to exist, a problem appears as soon as one seeks to determine more exactly the character of this presumptive relation.

How to look for the connection is the major test of an investigator's competence. Some problems make severe demands upon the ingenuity of the research worker; others, like that considered in the present article, are comparatively elementary in nature. Note the steps involved. In September of the academic year, 152 university freshmen were asked to list the names of those teachers they liked best (as well as those least liked) in high school and to indicate after each instructor the subject he taught. A month later, these same freshmen were requested to list both those high-school subjects they liked best and the ones they liked least, and to check those they planned to take in college. With this "raw material" at hand, all the investigators needed to do was to tabulate and classify the simple information secured on these two occasions. Straightforward counting and grouping gave the following interrelations (all based on 152 student replies):

1. Total number of teachers well liked ..... 490
   Average per student ..... 3.2
   Number of instructors greatly disliked ..... 212
   Mean per pupil ..... 1.4
2. Total number of subjects well liked ..... 569
   Mean per student ..... 3.7
   Number of subjects greatly disliked ..... 385
   Mean per student ..... 2.5
3. Total number of times *both* the teacher and his subject were well liked ..... 292
   *a.* Number of times students planned to continue

in college with well-liked subject taught by well-liked teacher in high school (of which 190 were by student's free choice) ..... 198

4. Number of times *both* the teacher and the subject he taught were disliked ..... 82

*a.* Number of times students planned to continue with study of disliked subject taught by disliked teacher (of which 18 were taken because of course requirements) ..... 22

Roughly two-thirds (190/292) of the favorable combination led to further voluntary learning in a field which had been fortunately introduced to the student, but only about 1/20th (4/82) of those whose secondary-school experience with the subject had been associated with predominantly unpleasant feelings continued with the topic. There is perhaps nothing novel or impressive about this commonplace finding — indeed, psychologists are often accused of elaborately demonstrating the obvious — but the implications for classroom management are nonetheless real. A teacher who wishes his pupils to like history (or mathematics, literature, etc.) must to some extent aim to have his pupils like him as a personality, because the learners react to the two different "things" as interdependent items of the same general situation. It is, of course, also true that if he wants them to like him as an individual, he must help them acquire a liking for the subject with which he is identified, although in this case the necessary pedagogical ends and means are inverted.

The records showed that these freshmen were able to distinguish between liking (or dislike for) the subject and liking (or dislike for) the instructor. Thus, there were 65 instances of the combination in which the teacher was liked and the subject disliked, but only 31 combinations in which the teacher was disliked and the subject liked. How the "intermediate" cases should be interpreted is hard to say. It is an educational tragedy when a boy with a liking for chemistry must pursue this work with an instructor for whom he has no "affinity"; something is also lost when a pupil and his instructor "take to" each other but the material with which they are dealing fails to enlist

the learner's enthusiasm. Some "incompatibility" evidently must be expected in all educational activities: No human being is universally liked by all and certainly no area of scholarship appeals to everyone. While the further voluntary pursuit of a given field is but a partial index of its value and satisfying power to the learner, the unmistakable evidence of these figures justifies every effort on the part of teachers to "ingratiate" themselves with their pupils and to awaken favorable emotions in connection with the subjects that they present and inevitably represent. Many of the causal relations embodied in this situation are unclear, but it must be apparent from this exposition that the "understanding, prediction, and control of human behavior" can be accomplished with easily managed tools of research that are in themselves quite unimpressive.

**Amount of gain in mental capacity during college days.** A different type of research with somewhat more severe demands upon the experimenter's powers of organization appears in the article on "The Intellectual Growth of College Students," by Charles D. Flory of Lawrence College.[1] This is essentially a problem in mental testing and is concerned with the determination of the age at which an individual reaches intellectual maturity. At what point in our lives do we stop developing in our capacity to deal with increasingly difficult *levels* of adaptation? This is an extraordinarily intricate question and Flory's study touches but a small part of the general problem. Originally it was the belief of experts in intelligence measurement that most persons cease to grow in problem-solving power after the fourteenth, sixteenth, or eighteenth birthday — the exact upper limit was left uncertain — but later studies have indicated that where stimulation appropriate to the maturity of the individuals is concerned such development can continue into the earlier twenties.[2]

In an effort to confirm this impression for himself, Flory retested

[1] *Journal of Educational Research*, 1940, 33, 443–451.

[2] Some of these references are important enough to reproduce here:

Agnes I. Rogers, The Growth of Intelligence at the College Level, *School and Society*, 1930, 31, 693–699.

Melvin B. Wright, The Development of Mental Ability at the College-adult

74 freshmen at the time of graduation four years later (1938) with an intelligence test "equivalent" (but not identical) to that taken upon college entrance (1934). Comparisons between the two sets of scores were made in terms of the 1934 percentile standards or norms, *i.e.*, the raw absolute scores were first converted into relational units. The freshman mean of 72.7 ± 1.62 was changed to a senior mean of 81.3 ± 1.42; the freshman median (an alternative measure of central tendency) shifted from 82.0 to 90.3; the difference in both comparisons is more than 8 percentile ranks. Two students actually gained 40 percentile points! This retest does not reveal the reasons for the improvement, but it distinctly renders obsolete the opinion that mental growth is complete in all or even most cases by age 18.

One interesting "side issue" presented in this study pertains to the constantly debated question as to what subject (or combination of subjects) best promotes mental growth. When the students were grouped according to their majors (fine arts, languages, natural sciences, and social sciences), the scores were approximately the same for each field of specialization, ranging from 6 to 10 percentiles, depending upon the method of computation employed. Although it is probably still worth asking what types of experiences produce the greatest changes in one's intellectual level with the least amount of time and effort, these findings make it clear that beneficial mental development may occur in *any* area of learning ordinarily offered in college. Unless these tests are grossly deceptive and unless some fatal flaw exists in the simple technique of duplicating a mental scale (such

---

Level, *Journal of Educational Psychology*, 1931, 22, 610–628. He found no evidence of an approaching plateau for complex mental processes even as late as age 23.

T. R. McConnell, Change in Scores on the Psychological Examination of the American Council on Education from Freshman to Senior Year, *Journal of Educational Psychology*, 1934, 25, 66–69. The scores at the beginning and end of Cornell College experience were significantly different for the same students.

L. D. Hartson, Does College Training Influence Test Intelligence? *Journal of Educational Psychology*, 1936, 27, 481–491. The Ohio State University Psychological Examination was used in this Oberlin study, but it yielded the same general results as those obtained with a different test at a different institution (see preceding reference).

as improved facility on the part of the students to deal with tests in general, slight practice effects, etc.), it is hard to avoid the conclusion that slight but nonetheless real and significant additions to one's basic intellectual stature can occur after admission to college.

**Identifying the components in spelling ability.** Representative of still more elaborate types of research in educational psychology is an analytical investigation by George W. Hartmann on "The Relative Influence of Visual and Auditory Factors in Spelling Ability." [1] Spelling errors, as every pupil and teacher knows, are among the commonplaces of school life, but like ordinary colds they recur repeatedly either because we lack the detailed knowledge necessary for their prevention or fail through deficient motivation to use the wisdom we already have. The links between psychology and our special cultural history and educational values are particularly prominent in this unspectacular field of spelling achievement. All languages, even highly phonetic tongues like Spanish and German, lend themselves to spelling errors by natives who know no other language; but English is conspicuous for the frequency with which the same sound can be represented by different and conflicting letters (or different sounds symbolized by identical forms). Some historians have humorously suggested that these irregularities are a consequence of the fact that printing was first introduced into England by Dutch or German printers, who, lacking direct acquaintance with the language, "froze" their own dialectical mistakes into the odd patterns to which even "natives" thereafter had to conform! A literate or bookish person thereafter spelled "correctly" whenever he adhered to the models thus accidentally but rigidly established. A more complete explanation of the peculiarities of English spelling stresses the varied origin of its component words and the tendency of written speech to retain letters which oral usage has gradually rendered "silent" or otherwise modified.

The importance attached to spelling is itself a curious problem in social psychology. Misspellings are essentially different ways

[1] *Journal of Educational Psychology*, 1931, **22**, 691–699.

of solving the same problem, *viz.*, intelligible communication, but deviations from a fixed sequence are almost universally condemned. Even variations that provoke mirth — such as Artemus Ward's ingenious rendition of "wife" by "yf" — are acceptable only in a humorous context. Standardization of a word's meaning is difficult enough even where consistent spelling is achieved (*cf.* such terms as "God" and "democracy") and multiple spellings would only add to the confusion; a person who distorts "psychology" so that it resembles "philosophy," "physiology," and "philology" merely makes harder the task of clear communication between himself and others. Simplified spelling that is itself consistent is free from this objection, but even here the values of the efficiency expert who is dismayed by the cumulated waste labor in writing useless letters clash with the values of the etymologist who rightly sees in every word something of its past history.[1]

These are some of the background considerations with which the psychologist must be acquainted before he begins to attack a specific educational problem in his own characteristic way. Even a limited topic of inquiry like "spelling ability" is too big to be handled in one piece — it is necessary to reduce it to such questions as:

1. How does one measure "spelling ability"?
2. With what features of a person is it associated?
3. What are the significant characteristics of a good speller as distinct from a poor one?
4. How does one become a good speller?
5. Are there any differences between boys and girls in spelling performance? Etc.

Question 3 from this sample series was chosen as the formulation best adapted to the experimenter's purposes. This led to the following steps: (*a*) the administration of a 50-word test to 636 undergradu-

[1] Thus, "thru" in place of "through" does not reveal the word's kinship with the modern German "durch." "Nite" is a poor equivalent of "night" (German "Nacht"); the "e" simply lengthens the preceding vowel. Actually, simplified spelling is not thoroughgoing enough in its efforts to rationalize existing usage, since the two o's in "thoro" really require two different symbols if the difference in sound is to be correctly rendered.

ates; (*b*) the selection of the 24 *best* spellers, 21 *average* ones, and the 18 *poorest* spellers from this large college group; (*c*) the giving to each of the three groups of eight laboratory tests so chosen that the comparative excellence of the subjects in visual and auditory tasks would be revealed; and (*d*) the statistical elaboration of the raw scores for the detection of such differences as are truly crucial.

On every one of the eight tests, the mean scores of the three groups arranged themselves in the expected descending order, *i.e.*, the best spellers stood first, the average spellers next, and the poorest spellers at the bottom. The experimenter's assumption that these measures had something to do with one's spelling score was thereby confirmed. However, the differences were not great enough in all but one case to meet conventional canons of "reliability," *i.e.*, in but one test were the chances less than one in 100 that the order of superiority would be reversed. Such requirements may be too severe — in many concrete life decisions we should be fortunate if we knew the chances were 60 to 40 with respect to certain outcomes. However, scientific inquiry is helped rather than hindered by rigorous tests. In this study, it had been assumed that good spellers are eye-minded and poor ones "ear-minded," but the data showed that the superior spellers were proportionally as outstanding in the visual "battery" (as a group of tests are called) as in the auditory battery. Evidently it is not the sense organ, but the "organizer" behind the sense organ, that is decisive.

The test which best separated the three groups was a measure of perceptual span for meaningful material. The words below were exposed for one second in a tachistoscope, an apparatus for presenting brief glimpses of material ordinarily screened:

| | | |
|---|---|---|
| ageratum | intaglio | Weismannism |
| Caedmon | metacarpal | onomatopœia |
| cleistogamous | peneplain | sphygmomanometer |
| gneiss | simony | exophthalmic |
| guimpe | synecdoche | Abderhalden |
| hemiptera | trephine | La Rochefoucauld |
| impetigo | trilobite | |

This laboratory test also gave the highest correlation (0.78) with the original spelling scores of the experimental groups. Apparently, spelling ability is no more a function of *general* visual perception than it is of general auditory perception, but it does seem to be largely dependent upon one special form of visual reaction, *viz.*, the accuracy of immediate word-form perception. Stated differently, good spellers are such primarily because they perceive total configurations of the verbal sort with greater facility than others. The specific meaning of what is discerned is of secondary importance, since practically none of the good spellers were able to define the unusual words in the above list which they reproduced quite successfully.

If a practically minded person inquires whether this lengthy, and apparently circuitous, study will help him spell better, the answer must be a cautious "yes." If the most important factor in learning to spell is to see and reproduce correctly a word that is presented to one's vision, then it is futile to attribute one's poor spelling to the vagaries of the English language or to deficiencies in one's auditory sensitivities. Only if one perceives a word properly at the time of one's first contact with it will one have met the necessary subjective conditions for its reproduction. It is like memory for faces — a vivid initial impression of the details and form of a person's countenance favors retention, recall, and recognition. Apparently, the structure or design of that which is responded to must be reacted to both with sufficient intensity and with a discernment of the essential internal relations if effective preservation of the "true form" is to occur. To be a good speller, one must perceive or capture the organization of the term to be spelled.

## THE ONE AND THE MANY

It is important that the reader observe in this miscellany of sample studies the common factors that appear in all. As in the famous classical theory of the drama, there is a definite beginning, middle, and end to each research; the climax of tension is probably reached when the crucial data are secured; the prologue and epilogue corre-

spond respectively to the outlining of the hypothesis to be checked and to the interpretation of the theoretical significance of the results. Some of the investigations are short one-act "skits," others may be pompous trilogies or ambitious cycles. Many of the pieces which comprise the "corpus" of educational psychology are incidental productions arising out of the opportunistic moods of professional workers; a few are grand conceptions that fit into a comprehensive plan of fundamental inquiry. But they are all alike in their general arrangement: Statement of problem to be solved → orientation in the literature → choice of method → details of procedure → presentation of findings → analysis and discussion of the results → conclusion, systematic interpretation, suggestion for further research, and relation to other inquiries. The number of human and social issues to which this investigative pattern can be adapted are literally endless. Some of the outcomes are meager and indecisive; others are brilliant and convincing in conception and execution, and rich in significance. Out of this varied material, the thing we call educational psychology is made.

Certain cautions with respect to the implications of this chapter must be given. Nothing but the roughest notion of the precise purposes, contents, and achievements of contemporary educational psychology can be gained by the sampling technique here employed. The sample is intended to give a fair picture of what has been, and is being, done in this field today; whether it really is such depends upon the impression conveyed by other methods of sampling this huge territory. Even more important is the necessity for developing some all-inclusive principle for making these scattered researches cohere. Conceivably they may fail to reveal any such unifying concept and reveal nothing more than a variety of contradictory notions. Nonetheless the search for the broadest possible generalizations must go on if one is to win power over occurrences before they arise. Educational psychology is more than a mass of disparate facts: It is equally, if not more conspicuously, an integrated body of principles concerning behavior.

**A model and contrast.** Suppose one were asked to state who knew more about a certain field of study — the person who was familiar with five facts or the one who knew twenty. We may assume the facts themselves to be of equal importance. Without much reflection, most persons are disposed to say that of course it is more desirable to be acquainted with twenty facts about a given issue than with five — indeed, it is four times as good! However, suppose one student knew these five facts in all their permutations and combinations with each other, and another knew his twenty facts merely as discrete experiences. Symbolically, the situation might look like this:

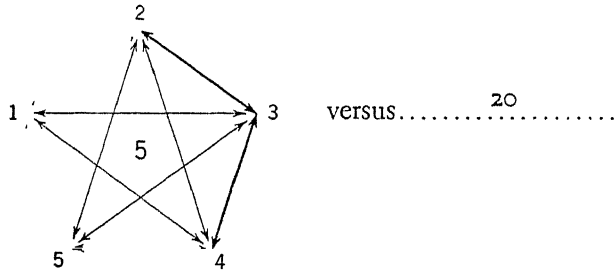



FIGURE 9

Obviously, *more* (both of experience and of meaning) *may* reside in the organized pentagon than in the purely linear dot series. Whether it actually does, depends, of course, upon some empirical check. The present text is built upon the assumption that this will prove to be the case.

An old Latin proverb declares, *non multa sed multum* (not many, but much). The distinction between sheer frequency or amount of information about a problem and the focal grouping of such knowledge is the difference between ineffective and effective organization of material. One's contacts with the raw materials of educational psychology should not be such that one cannot see the forest on account of the trees. Perspective comes as a result of sensitivity to interrelations. No two items, no matter how far apart they may seem to be, should be learned without asking what is the nature of the relation between them. To be sure, not all relations are fruitful

any more than the fundaments between which the relations obtain are inherently of great value. But the only way to mount to higher and higher syntheses is to adopt and maintain a "systematic" attitude of seeing events and properties in their wholeness rather than as isolated happenings in a "rag-bag" universe.[1]

## B. *Topology as a Representative System of Psychology and Its Application to Problems of Achievement in School*

From what has gone before one may easily and quite rightly gather the impression that contemporary educational psychology is struggling with itself in an effort to arrange its contents in a manner befitting its pretensions to scientific status. The best help it can get in this quest for intellectual respectability is found when it makes use of some comprehensive theory which serves to synthesize and integrate the numerous studies that are at hand. This is no mere scholastic exercise but an enterprise rich in personal and social consequences, as the following passage from Confucius suggests:

The illustrious ancients, when they wished to make clear and to propagate the highest virtues in the world, put their states in proper order. Before putting their states in proper order, they regulated their families. Before regulating their families, they cultivated their own selves. Before cultivating their own selves, they perfected their souls. Before perfecting their souls, they tried to be sincere in their thoughts. Before trying to be sincere in their thoughts, they extended to the utmost their knowledge. Such investigation of knowledge lay in the investigation of things, and in seeing them as they really were. When things were thus investigated, knowledge became complete. When knowledge was complete, their thoughts became sincere. When their thoughts were sincere, their souls became perfect.

[1] These last two paragraphs owe much to a simple illustration first outlined by Kurt Koffka on page 5 of his *Principles of Gestalt Psychology*, New York, Harcourt, Brace & Company, Inc., 1935. — Another example drawn from a different field is the ability of a champion typist to type coherent text at the rate of eleven and one-half letters per second, and yet he could not pronounce eleven distinct letters in that time or make eleven repetitious pencil taps. "Grouping" is what makes the feat possible.

When their souls were cultivated, their families became regulated. When their families were regulated, their states came to be put into proper order. When their states were in proper order, then the whole world became peaceful and happy.[1]

The interdependence here eloquently held to obtain between the simplest bit of knowledge and the welfare of the entire world may seem too good to be true, but its logic is all but irrefutable, and it expresses a viewpoint which is being rediscovered in every phase of current living. In psychology this position is most vigorously and congenially held by the field or organismic outlook of which the gestalt theory or configurationism is a particularly well-developed example. This last in turn has been differentiated and specialized by Kurt Lewin into the interpretive system of topological psychology. This system "maps" the behavior of the individual — school behavior being treated as a special instance of "general" behavior — in accordance with a limited set of concepts and symbols which serve to portray the shifting "spiritual geography" of every form of conduct. A number of illustrations of this method are given in the following, partly for the sake of demonstrating the practical usefulness of this procedure but also to show gains which come from a unified approach to the endless variety of problems in educational psychology.

## WHY PUPILS FORGET

Teachers are constantly confronted with the fact that the experiences they offer their pupils vary markedly in interest value. This observation is usually accompanied by another indicating that occasions low in emotional appeal or positive hedonic quality tend to be learned with difficulty and are easily forgotten. The following situation on the college level is the most impressive example of the con-

[1] Quoted from *Your Life in the Making* (Personal Growth Leaflet, No. 1) by Joy Elmer Morgan, Editor of the Journal of the National Education Association. The original is in *The Great Learning of Confucius*, verses 4 and 5, handed down by the philosopher Tsang. Cf. *Chinese Classics*, Vol. I, pp. 221–223, Hongkong, 1861, translated by James Legge.

sequences of "meaningless" instruction ever encountered by the writer:

While the Carnegie Pennsylvania Study on the articulation of secondary-school and college work was in process, it was noticed that the mean scores on the general-culture test (a comprehensive measure of liberal-arts content) were roughly the same for all four undergraduate classes. In checking this with two administrations of the same instrument to identical persons as sophomores and again as seniors, it was found that four semesters of added collegiate instruction had failed to produce any difference in the scores. This could be attributed to (1) the incapacity of the professors, (2) the dullness of the students, (3) the invalidity of the test, and (4) the failure of the curricular content to become integrated with any of the major life purposes of the learners. Assumption (4) seems the most probable, for we know that to most American undergraduates the fact that "Sappho was the greatest poetess of ancient Greece" is irrelevant to any serious concern of theirs and hence doomed to be readily lost.[1] Multiply this item by several thousand and it is easy to see why much of the content that students are given an opportunity to acquire is either never assimilated or else quickly eliminated.

How shall we represent this situation in terms of diagrammatic analysis? What special topological concepts are of service in understanding this all too familiar phenomenon?

**Meaning of "closeness to self."** Some interpretative aid may be given by the notion of "ego nearness," *i.e.*, the fact that some items of experience involve the *central* core of the personality whereas others are of a *peripheral* — a less intimate — sort. Thus, the data about color-blindness (*a*) tend to have a "central" character for a man so afflicted, but Assyrian archaeology (*b*) and the diseases of extinct animals (*c*) are usually far out on the margin, away from the inner self. This situation can be portrayed as is shown in Figure 10. This means that the learner's total personality (*P*) is so structured

[1] *Cf.* an article by the author on Fluctuations in General Cultural Information among Undergraduates, *Journal of Educational Research*, 1934, 28, 255–264.

that outer and inner layers may be distinguished. Some experiences penetrate the outermost boundary but go no deeper; others find their way into the most private and strictly "personal" region of the individual's life. The thick ring around $E$ indicates that relatively few events involve the actual core of the ego — it is, as it were, protected against intruders. When a teacher gains rapport with a child and

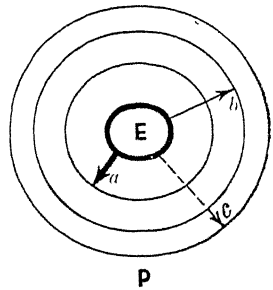



FIGURE 10

How certain events affecting one's personal structure ($P$) are located on a surface-interior gradient. Fringe experiences are readily lost because of their weak links with the nucleus ($E$). Presumably, learning occasions are "exciting" to the extent that this internal region is active.

wins its confidence, it means that his influence can extend to the very heart of the child's being. However, individuals who are uncongenial to each other tend to have the most cursory or "superficial" contacts. Formal, cold, stiff, impersonal instructional procedures move along the marginal edges of the self and encounter a hard and resistant shell. Informal, friendly, "democratic" approaches permit fairly swift ingress and evoke warmer participation. Where "more" of the learner is involved, greater teaching efficiency is certain to occur because it achieves a more lasting reorganization of his mental structure.

It therefore seems to be a reasonable view that most, if not all, failures to retain the content of school subjects, which are not traceable to intellectual deficiencies or to inadequacies in procedure, result from the low degree of "psychic reality" the learner experiences with reference to the thing to be learned. We have substantial experimental evidence that items presented in an irreal context fare much more poorly in immediate and delayed recall than data learned

in a setting sensed as "real," *i.e.*, significant and important to the pupil.[1] This is roughly the new topological or "spatial" formulation of the old problem of pupil "interest."

## THE NECESSITY FOR PLANES OF REALITY

If we consider the "life space" of the learner as the totality of facts which determine his behavior, one is compelled to assign to this space a third or "reality" dimension. This does not appear directly in the drawing (Figure 10), but observation indicates that many psychological events occur on a plane of "irreality," *i.e.*, the universe of day dreams, wish fantasies, etc. The chief characteristic of this level of experience is "fluidity" which simply means that objects can be "manipulated" here with a freedom that is impossible on a more concrete plane. Here causal rigor does not operate. On this level, the schoolboy can envisage the teacher on her knees before him pleading forgiveness for her many unkindnesses to him. In accordance with the tendency for the Ego to hold itself as high as conditions permit, a superior power is achieved on this level which contrasts with his actual inferior position. Figure 11 illustrates the essential relations.

The normal or sane person is aware of these gradations in psychological reality and stands to some extent outside the irreality plane, for that is an apparent precondition of "objectivity" in judging facts. At any rate, he is able to maintain free communication between the different levels. A scientist's "hypothesis" first floats on the irreality level, but as soon as it is supported by experimental "evidence," it acquires the status of "theory" or "law" and tends to be localized on the reality plane. New and better data may cause it to revert to the level of an unwarranted assumption or "myth."

Fruitful and creative imagination functions in this manner. The deranged, however, have lost this structural pattern (as well as the orderly to-and-fro mobility that accompanies it), and their life space

[1] See J. F. Brown, Ueber die dynamischen Eigenschaften der Realitäts- und Irrealitätsschichten, *Psychologische Forschung*, 1933, 18, 4–26.

becomes distorted so that they are literally disoriented. Their reality dimension or scale is either absent (in which case they would be living in a psychologically two-dimensional world) or grossly reduced. From the standpoint of mental hygiene, education in problem solving may be making unexpected contributions to preventive psychiatry, for the

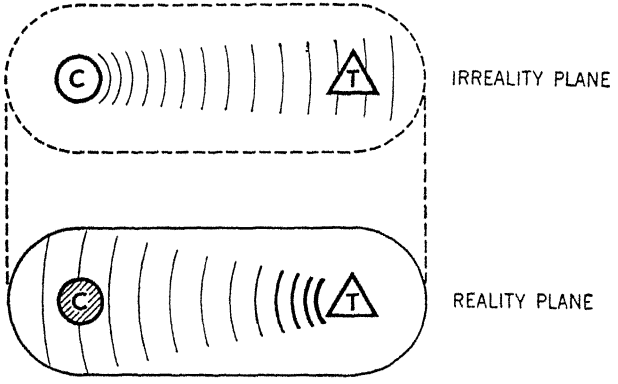



FIGURE 11

Reversal of normal pupil-teacher relations on the ideational plane, as a result of conflict and emotional strain. △ is the accepted symbol for an adult; the arcs represent the lines of force, radiating in one case from the teacher and in the other from the child.

experimentalist approach is one of the best ways of learning how to "keep one's head in the clouds and one's feet on the ground." Since dementia praecox is the most serious form of adolescent maladjustment — with its all but total exclusion of the reality plane — any control of individual development that minimizes this possibility is of extraordinary social value.

## THE LOCOMOTION ASPECT OF PROBLEM SOLVING

An old and recurrent problem in classroom management is posed by the "restlessness" of pupils before holidays, overdue recess periods, or the distracting influence of warm spring weather when the baseball season begins. Even when the work of the class is wisely adjusted to the fluctuating interests of the learners, projects that have been gladly undertaken but which require some time for their completion frequently lose their appeal before the natural terminus is

reached. The situation is made worse by the appearance of powerful attractions from the outside. Under such circumstances, teaching and learning efficiency are so adversely affected that a dismissal of the group is all but imperative.

Understanding and control of such situations are facilitated by recognizing that a *need* is basic to all learning. A need corresponds to a state of tension in the system. The tension itself seems to be a

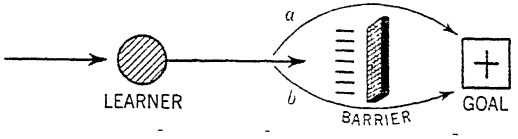



FIGURE 12

A schematic illustration of the dynamic character of wants. The organism has a desire or appetite to attain a certain objective, but the barrier must first be surmounted. The arrows indicate that the total field structure impels the organism toward the goal and thereby places it in a state of tension (indicated by the cross-hatching). Note location of plus and minus signs.

consequence of the physical, mental, or social "field" in which the learner is imbedded. This is the motivating power that keeps the learner active in the pursuit of his objectives until his tension is reduced or removed by the altered organization of his field.

To illustrate: A boy with special talent for lettering volunteers to design the cover page of a class magazine which his classmates wish to issue. This situation produces a mildly "tense" state of affairs that continues until the desired end is achieved by appropriate action on the part of the artist. The goal is said to have a positive valence because it pulls the organism toward it. The directed nature of this activity is indicated by a "vector" in the diagram (Figure 12) which seems to be typical of most forms of "purposive" behavior.

This is the basic situation underlying all learning (and perhaps all behavior). Smooth and unimpeded problem solving is the exception rather than the rule. Barriers of some sort are usually present. They may be *physical* (like the barbed-wire fence around an orchard), *personal* (inability to climb, stupidity, etc.), or *social* (the Ten Com-

mandments, fear of the police, desire for approval of elders, etc.). Some barriers cannot be overcome directly by simple attack but demand a detour solution, as indicated by arrows *a* and *b* in the preceding figure.

**General concept of "movement toward a goal."** If goal seeking describes the essential nature of the learning process, then something like a "psychic locomotion" takes place in this type of mental ac-

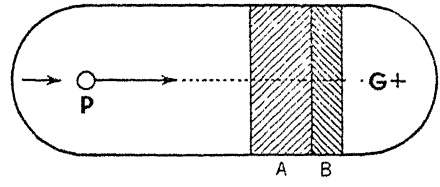



FIGURE 13

Path followed by a person moving toward an "answer" to a problem that can only be solved in stages.

tivity. To "arrive" at a conclusion is topologically more than a figure of speech. We recognize this plainly enough when using an automobile to reach a destination, but it appears to be equally true at a higher plane of conceptual insight. Thus, if a pupil is wrestling with a difficult arithmetical problem, he may have to pass through a number of intermediate positions in order to reach a solution. Dynamically this corresponds to two or three sub-barriers, field obstacles or "hurdles" placed in the path of the ultimate objective, as pictured in Figure 13.

Psychological locomotion of this sort also appears with added social components in most cases of vocational guidance. The high-school girl who wishes to become an elementary teacher is literally placing herself in the situation illustrated in Figure 14.

Guidance and self-management under conditions of unitary impulsion toward a clearly defined end offer little difficulty but may become a problem of exceptional acuteness where the individual is torn between two equally attractive goals. William James remarks somewhere that in his youth he was undecided on his life career, and that his particular dilemma took the form of determining whether he

would be a philosopher or a lady-killer. This problem was simplified when he realized that the philosopher and the lady-killer could hardly reside in the same tenement of clay. Such alternatives cannot be construed as mutually compatible and hence solution by integration is eliminated. However, many such oppositions are false antitheses, for values are rarely so hostile or exclusive of each other. There is danger of committing what has been called " the fallacy of the forgotten alternative." Many persons view the different purposes they have as a case of ice cream *or* cake, when there is no reason why they

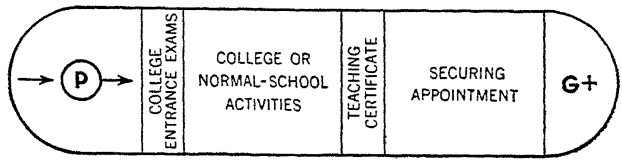



FIGURE 14

Regions through which one must normally pass in preparing for a teaching career.

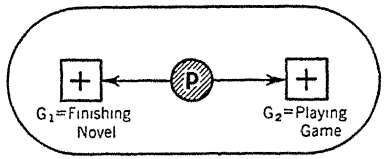
could not have both (at least in an age of plenty). The boy who enjoys chemistry *and* a rural outdoor life may resolve his conflict by becoming an agronomist; the girl who likes acting and teaching may become a specialist in dramatic literature. Wisdom and economy of energy seem to lie in construing such situations after the general patterns in C and D rather than the models of A and B, of Figure 15.

## MOTIVATION AS A STRUCTURAL PHENOMENON

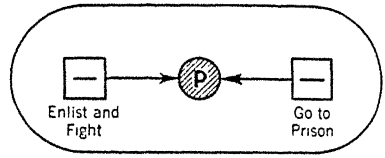
One topological principle of considerable practical importance declares that the valence of an object is a function of the field that embraces it. This is simply a more formidable phrasing of the generalization that a good is not absolute but relative to the time, the place, the condition of the personality involved, etc. Physical satiation and a kind of biological law of diminishing returns seem to explain the lowered attractiveness of the tenth chocolate bar as compared with the first. There is a different quality about a lump of chocolate that reaches the stomach after nine others like it have preceded which marks it off from the one which enters first. If location

in a spatiotemporal series has such obvious effects, then clearly other types of reorganization and emphasis will be influential in determining the properties of things.

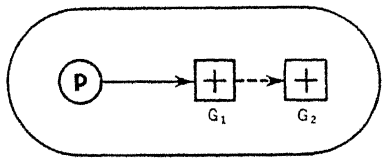
Prescott Lecky describes the case of a gifted college sophomore who spelled atrociously.[1] During the counseling process, it developed



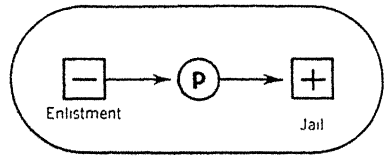

*Situation A.* (Amusement problem of a hypothetical debutante.) Tension evoked by unresolved conflict caused by two goals of equally positive valence. Neurotic inhibition (abulia) and wasted effort result from maintaining such a condition over a period of time.




*Situation B.* (Social predicament of a young man who hates war.) The devil-and-the-deep-sea, or the Scylla-Charybdis situation where either alternative is distasteful. Again, energy is dissipated in an unconstructive way.




*Situation C.* (The answer of the "social butterfly.") Conflict of A resolved by taking both goods in succession.




*Situation D.* (Solution preferred by the "conscientious" or "rational" objector to war.) Accepting the "lesser evil" which thereby functionally acquires a positive valence. To avoid a stalemate, any decision may be better than no decision.

FIGURE 15

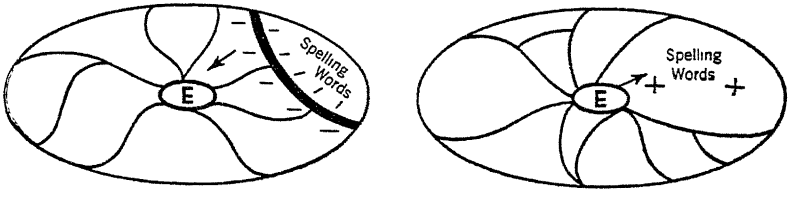
Types of conflict in adult life and some possible rearrangements.

that the youth did not look upon correct spelling as of any significance, but that he was also proud of his general intellectual ability and competence. The advisor suggested that inadequate spelling was inconsistent with his ideal of himself as an all-round superior personality. Affected by this motivating insight, the boy's spelling difficulties disappeared almost overnight. The spelling act, which had hitherto been detached from the student's life pattern now became an integral

[1] Unpublished paper on The Theory of Self-consistency in Personnel Problems.

part of his dominant system of values. The shift from one situation to the other is outlined in Figure 16.

It is almost certain that something akin to this "mechanism" accounts for the pronounced psychological advantages of "functional" as contrasted with "formal" instruction. Functional teaching *at its best* is not just an adaptation of stable curricular content to the needs of the learners — instead the wants of the organism are




*Situation A* *Situation B*

FIGURE 16

How changing a person's attitude toward an academic skill improves performance. In situation A, spelling lacks "value" because it is not unified with the dominant system of ideals, in situation B it has "value" because it is organized into the personality structure.

first catalogued and a picture constructed of the positive and negative valences operating in each child's life, after which suitable developmental experiences are offered. Formal teaching *at its worst* follows the model of routinized delivery of stimulation with little or no regard to the initial and final status of the personalities subjected to this treatment; it commonly has a blind faith in the absolute worth of factual "materials" as such, forgetful that in intellectual as well as in alimentary affairs, what is one man's meat is another man's poison. It is significant, however, that topology conceives of the possibility of transmuting poison into meat, not primarily through the introduction of a new factor but essentially through the reorganization of existing forces.

One parent, finding that his young daughter occasionally objected to her regular dose of cod-liver oil, overcame her reluctance by transmuting the attitude of resistance into a play outlook. The spoon was called the train and the child's mouth the Grand Central Station;

then the father, holding the spoon at a distance and slowly moving it "mouthward" said, "All aboard! Train leaving Buffalo for New York. Choo, choo, choo . . . Rochester, Syracuse, Utica, Albany, . . . Grand Central Station!" The oil was readily accepted not as part of the "medicine" situation, but as a dependent item in the "game" pattern. In this way, something negative became positive.

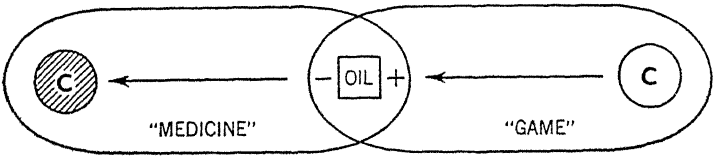



FIGURE 17

How the psychological properties of a spoonful of cod-liver oil are affected by inclusion in two different wholes.

It would be a mistake to assume that the chief service of the topological viewpoint is to make "inherently" disagreeable tasks more palatable to the learner. What should be clear from these examples is that the properties of an object or event — indeed, their very existence — are dependent upon the nature of the "field" in which they are found. The teacher's job is to manipulate the field that embraces the learner until he can discharge this function himself, a procedure which requires ever-increasing participation of the pupil in his own control. When the student discerns what alterations in the field do to his personality, his maturation has proceeded far in the direction of mastery over self and circumstance.

## THE USE OF TOPOLOGICAL REPRESENTATION BY BOTH TEACHERS AND PUPILS

Although it admittedly comes with an aura of strangeness and therefore apparent difficulty, the simple conceptual tools that a field psychology employs require no more than an honest sketching of what one "sees" in any concrete situation. The objectivity inherent in these drawings as a means of person-to-person communication can be a major influence contributing to sincerity of purpose in all

professional discussions. The "doodads" and odd scribblings on tablecloths and other surfaces that men commonly resort to when the impulsion to make things clear to themselves or to others is present constitute the humble root from which the more technically impressive and systematized ideographs of the topologist have grown. They serve the useful and necessary function of concretely deverbalizing educational theory that often gets lost in thick word fogs; yet paradoxically they also succeed in generalizing educational phenomena by identifying unmistakably the common genotypical structure that underlies the diversity of phenotypical situations whose basic similarity is obscured when non-field techniques are employed.

It is strongly suggested that whenever a teacher or older pupil encounters some difficulty, they sit down together and try to "draw a picture" or model of their predicament. Some of the portrayals will be but first approximations to be discarded as better ones arise. Thus they will accomplish that important aim of all personality growth — to see ourselves not only as others see us but as we and others *must* see the same objective situation if we approach it with comparable earnestness and openness to stimulation. By merely being persistently consistent and intellectually honest, teachers and pupils, each in their own way, can improve the classroom work in which they are involved. Reducing the issue to a "paper diagram" may seem like a mildly ludicrous way of solving grave questions, but the apparent success of the method in certain pioneer ventures (such as those conducted by Helen Campbell in practice-teaching courses at Mt. Pleasant, Michigan) gives strong support to this practice.

Extensive and even grotesquely amateurish applications of topology or any comparable system of behavioral "portraiture" should also do much to erase the disturbing and regrettable gap so commonly found between educational theories and school practices. It is psychologically inevitable that students will teach as they have actually been taught rather than as they have been taught to teach — and the two unfortunately do not convey the same lesson. But there is nothing inherent in education to make it long on ends and short on means.

Teaching that is more than routine requires the interpretation of practice in terms of theory and the *corresponding* interpretation of all theory in terms of practice. These and other outmoded contrasts or dichotomies — such as the "individual *versus* society," "instinct *and* intelligence," "heredity *versus* environment" — must be supplanted by an integration that confers effective meaning upon both terms by keeping together what should never have been separated. Perhaps so grand a result is too pompous a claim to be made for such modest devices as this chapter has introduced, but then any means that makes the total psychological setting in which we are found more "fluid" and amenable to symbolic characterization does tend to facilitate real learning and mastery of the experience.

## SUMMARY

In this chapter we have sought to provide the reader with a picture of what educational psychology is like today, not by definitions and characterizations of the state of the subject, but by a presentation in some detail of the kinds of questions which occupy the energies of educational psychologists at the moment. The significance of much that is to appear later in this volume will be increased by an awareness of the types of research that furnish the foundations of this field of knowledge. Educational psychology has to be approached as a whole before the particular subdivisions that comprise it can be rightly understood. On the basis of what has been assembled in this chapter, it should be possible to discriminate in the application of psychology to educational problems three notable features, *viz.*, (1) content, (2) method, and (3) viewpoint. No psychological question is really alien to the purposes of a comprehensive educational program, and conversely (and even more emphatically), no educational question is foreign to a psychology that is really alert to its opportunities and sensitive to its social obligations. Teaching decisions are constantly being made with reference to the differences in "intelligence" and "interest" among learners — both general psychological categories of prime importance. Obviously, psychology

considered merely as another kind of *subject matter* has a special pertinence to classroom management. In addition, the techniques of experimental psychology which proved to be such powerful tools in unearthing the facts about the simpler sensory processes of the human being have been extended to cover the "higher thought processes" about which public education is typically centered. Measurement of mental functions is not restricted to speed of reaction time but expanded to include the variations in accuracy of visual perception seen in spelling, reading, and other school activities. Finally, there is an attitude or orientation known as the psychological "slant," which, when present in an educator in the form of a working "system" of the kind illustrated in Section *B* enables him to identify and emphasize certain features in pupil behavior which would otherwise be overlooked and to harmonize them with his general view of the world. These are some of the implications of even a casual glimpse at that body of records and publications collectively labeled "educational psychology."

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Ask some "intelligent layman" who has never taken a course in "educational psychology" or read a book so entitled what he thinks this subject is all about. Compare his general statement with one you would make yourself at the present time. Which is more impressive — the resemblance or the contrast between the two interpretations? Can you tell why?
2. State briefly three distinctly different and definite types of problems which in your judgment could most appropriately be investigated by an educational psychologist.
3. Why are the results and findings of any scientific inquiry so dependent upon the methods employed in obtaining them?
4. Is it impossible to plan any sort of experiment without some hypothesis in mind at the start? Illustrate. Does every "question" (in the nontechnical sense) presuppose that the questioner already has some rough notion of the range of possible answers to his query? Can any question be asked without some existing knowledge about the content to which it pertains?

5. How does one determine what facts are related to other facts? Are there any two facts in nature completely and permanently devoid of any pertinence to each other?
6. Describe topologically, *i.e.*, à la Lewin, the initial situation in which a new teacher in a community finds himself, and compare this with the situation after he has been "assimilated" and accepted as a member.
7. After consulting the necessary library resources, state as briefly as possible, the leading idea(s) of the following "schools" of psychological thought:
   associationism-connectionism
   behaviorism-objectivism
   configurationism (field-gestalt-organismic-topological)
   dialectical materialism
   eclecticism
   factorial psychology (neo-faculty school)
   functionalism-dynamism
   hormism-purposivism
   personalism ("self" psychologies)
   psychoanalysis ("depth" psychology)
   reflexology (conditionism)
   structuralism-sensationism
   Thomism (neoscholasticism)
8. What is the characteristic educational emphasis or implication of each of the "systems" mentioned above? To what distinct practices would each be especially congenial?
9. Must education change as our knowledge of man's nature and behavior changes?

# PART TWO

## THE IMPROVEMENT OF THE ORGANISM AND ITS FUNCTIONS

# *INTRODUCTION*

The heart of educational psychology is found in this grand question: How can the human personality be changed for the better? Behind all its theories, beneath all its miscellaneous facts, and in back of all its past and current activities, this persistent problem appears. It is a nice psychological puzzle itself to explain man's interest in his own improvement and in the betterment of his fellows, but it is the starting point of all deliberate educational effort. Unless people become in some way superior to what they would otherwise be without the benefit of school life, no reason would exist for the maintenance of an educational system. Significantly enough, the effort to improve oneself and one's associates leads to attempts to reconstruct the field conditions *outside* the human organism, because these circumstances are usually decisive in determining what any person is and does. The social component of educational psychology is therefore not something imported into it, but an essential and inherent factor from the very beginning.

Before anything can be modified, the thing itself must exist in some form. Modification begins with the existent and not with the nonexistent. That with which one starts is always the result of earlier modifications, a fact which makes change one of the primordial realities of experience. The task of education, and of all planned and purposeful behavior, is to direct these transformations toward ends approved by the better or "higher" aspects of man's nature. What these superior features in himself are the individual must learn as he grows through life; such wisdom is not a dependable or original part of his endowment. Many changes arise solely from the passage of time — more strictly, from metabolic and other natural processes

occurring *in* time — but since these alterations are not a matter of indifference to us, we try to further some and to prevent others. To assist persons, particularly teachers and pupils, to realize their goals and to avoid undesirable results are the chief implicit aims of all educational psychology, although not a purpose peculiar to this discipline alone.

An organism that has reached a certain level of maturity — such as the ability to read these lines — is capable of a large measure of self-direction and should be entrusted almost completely with the task of perfecting itself, *i.e.*, of specifying its objectives and devising ways and means of reaching them. This does not mean that the living system ought to operate on a purely individual basis; many of its "private" aims, *e.g.*, world peace, require close co-operation with persons similarly motivated and painstaking attention to the drives of those whose ends conflict with theirs. The imperatives of group behavior constantly linger in the background of every personal "wish." However, even the most regimented individual can contribute something to his own development along the lines he prefers. Benjamin Franklin is a conspicuous example of one who early in life formed a plan for his own self-improvement and executed it with considerable success;[1] but many lesser figures have done substantially the same. Effective teaching may still learn much from a critical analysis of the methods by which eminent men have sought to shape their own natures. No instruction worthy of the name dare lose sight of its mission to help the learner arrive at a point where he can administer his own learning.

[1] For evidence on this point see Carl Van Doren's Pulitzer Prize biography. This account is even better than Franklin's famous *Autobiography*, for it shows more clearly the origin of these "resolutions," the nature of the control they appear to have exercised over their author, and the achievements to which they contributed. It is noteworthy that Franklin's attempts to improve himself preceded, but were always closely associated with, his efforts to better the social order of his time. Today the true betterment of the self and the betterment of others (*i.e.*, the "community," "nation," or "world") are even more intimately linked. Unfortunately, this insight of "enlightened selfishness" is so far but dimly apprehended by most folks. To make it universal is one of the unfinished pieces of business for contemporary education.

The eight chapters which comprise Part II of this volume are presented largely for the purpose of encouraging the learner to arrange the process of "self-learning." At best, this control over one's development remains far from complete, because many of the forces that make one what one is cannot readily be brought within the scope of one's management. Thus, one may be able to increase greatly the efficiency of a skilled motor performance but fail to make any clear gains in regulating an emotional response. Unevenness of attainment in these different psychological functions has hitherto been the rule, although even in the case of the most refractory aspects, our understanding is enormously greater than it was a few short generations ago. We are in the midst of a vast psychological revolution which promises to increase our command of self and others in a way that may dwarf even the impressive mastery of the physical world achieved by the Industrial Revolution. It is true that regrettably few people can as yet look upon their most cherished beliefs with the same "detached," objective, or naturalistic gaze that they occasionally turn upon their own bone structure, their handwriting, or their pronunciation. But social attitudes can be improved just as penmanship can be bettered, *viz.*, by a movement in the direction of greater "attractiveness." They are not wholly immune to "reason" or reflective examination, and information that is both complete and pertinent does have some effect. It seems fairly safe, therefore, to claim that anything we can do now could, under certain conditions, be done better. This is the faith that guides the educational psychologist as he searches for those factors which make improvement possible.

Teachers have long asked such questions as these: Is there any way of interesting this child in the reading of history books? Why does Arthur "give up" as soon as he encounters a mild obstacle? What can I do to lessen the fear of talking in public? Is William hopelessly poor in mathematics? Will my swimming improve if I try a new stroke? Can Laura be made as ambitious as Mary? How does one write an original poem? What makes one person logical and another slipshod in his thinking?

These are but samples of the all but endless list of queries that arise in the course of classroom management. Most of them can be answered effectively by the teacher himself or by the ordinary school child during adolescence, provided that the basic principle of behavior is correctly isolated or applied in each concrete case. No human acts or attributes are lawless; they grow out of some field; the forces in every biosocial field are flexible and yield, at least in part, to manipulation by one who perceives their interrelationship; the possibility always exists that such manipulation of the situation will eventually produce an improved person or a more satisfactory state of affairs. The chapters which follow are designed to offer a body of ideas about various features of pupil behavior which can be drawn upon for the promotion of favorable adjustments.

# Chapter 6

## *INCREASING THE EFFECTIVE INTELLIGENCE LEVEL OF INDIVIDUALS AND GROUPS*

Men have sought in life many different things for themselves. Wealth, power, fame, love and friendship, health, beauty, skill, and strength — these are some of the blessings that the ancients longed for and which most of us still find good, and after which it is probable our children will continue to strive. True, the competitive struggle for the first three values in this series has caused the race much hurt as discerning minds in all ages have emphasized. Recognized as a value of genuine merit by a more limited group was the quality of wisdom or knowledge, by which was meant essentially what we now understand by intelligence, for these related concepts were not originally differentiated. Then as now men preferred to be clever rather than stupid; although the much abused term "fool" is thick with ambiguity and at present probably indicates no more than that one is antagonistic to, or disagrees with, the individual so designated, most persons continue to favor the substance and appearance of brightness over the possession or imputation of dullness.

### SOCIAL PRESTIGE OF INTELLIGENCE

The considerations just mentioned are of genuine importance for they indicate that "intelligence," regardless of the different ways in which it has been construed, is not a neutral biological trait but something that evokes esteem and admiration if present in marked degree and disesteem, contempt, and pity if present in but small measure. Other things being equal, to say that a person is intelligent

is not just to state a bald fact: It conveys a note of both praise and deference. Why? Until one examines the favored social position which intelligence seems to hold when compared with most other psychological functions of the living system, one cannot hope to be properly oriented in the astonishing controversies which surround this topic. Here as elsewhere, acrimony will yield to insight and creative thought only if a broad and generous approach is adopted and steadfastly maintained.

How topsy-turvy all our current popular and scientific concepts of intellectual ability would be if they were applied to a society which prized and honored the subnormal and ridiculed the possessor of a superior IQ solely because of it! Nevertheless most of us would be hard put to offer an "intelligent" explanation of the social status, value, or prestige commonly assigned to intelligence. It cannot be attributed to its unaided capacity to further personal happiness, for the correlations between IQ and self-estimates and associates' ratings of happiness hover around zero.[1] For many occupations, intelligence beyond a certain optimum is a disadvantage rather than an aid to vocational adjustment. The correlation with income has never been satisfactorily obtained for a random sample of the general population; the connection is almost certainly positive, but the *r*'s probably would not exceed 0.20 or 0.30. It seems clear that intelligence is not rewarded for its own sake, but only when it appears in organic connection with other features that are valued by the community. The bright person who challenges the folkways or stateways of his nation may suffer death, imprisonment, exile, and other forms of suppression; if, however, his intelligence is placed at the service of the local mores, the customary rewards in purchasing power and recognition are commonly bestowed. In short, it seems that intelligence is valued in our culture not for its own sake, but in proportion to its efficient utilization in supporting or furthering the current value schema of those who have the power to testify tangibly to their appreciation

[1] G. W. Hartmann, Personality Traits Associated with Variations in Happiness, *Journal of Abnormal and Social Psychology*, 1934, 29, 202–212.

of this service. This is not a cynical observation; it is simply an elementary background datum that accounts for many of the detailed relationships frequently revealed by existing measures of ability and which will require further discussion below.

## THE CONCEPT OF INTELLIGENCE

Every student or professional practitioner of the teaching and learning processes has an obligation to be as intelligent as he can about the problem of human intelligence itself. By this is meant nothing more nor less than the *willingness* and the *capacity* to study the *conditions* responsible for the variations in the power to make *adaptive responses* that are encountered in any collection of human beings. This statement is simple enough, but its wide ramifications have involved educators and psychologists in an extraordinarily intricate tangle affecting both their theories about human conduct and their personal practices.

Let us go back to the very beginning of our systematic position. In Chapter 3 we stressed the fact that educational psychology must be built upon the human body and its functions. Without the physical organism of our species there can be nothing called behavior or conscious experience because these phenomena require a body as a precondition to their own being. Intelligent behavior, since it is essentially just one special kind of behavior, must therefore rest — at least in part — upon some corporeal foundation. This organic basis is primarily the nervous system, set in the framework of the entire living structure.

The next point to be examined is the character of the intelligent act itself and the difference between it and that labeled "unintelligent." This is not as easy as it seems; the proper concept is not conveyed by a simple definition, for definitions come best at the end of an investigation and not at the start — indeed, a major consequence of thoughtful inquiry is the change in definition that results. However, an *approximate* or tentative definition is usually necessary before one can begin at all. In other words, we usually have *some*

idea of the item being studied, but hope that it will become more precise as we advance our exploration.

**A case analysis.** Consider the following not uncommon situation: A chauffeur and his friend are driving a new automobile smoothly along a level country road when suddenly the car slows down and comes to a stop despite the driver's intention to continue his even pace. What is wrong? The chauffeur repeats the combination of controls which normally suffice to keep the car running, but nothing happens. Obviously, here is a problem. A difficulty has arisen and the behavior of the men in the car, *i.e.*, the acts carried out by their bodies, must be changed to meet the new situation. If they had planned to stop at this spot to survey the nearby field of growing corn, the case would be different; but as it is, their purpose to continue driving has been frustrated by the failure of the car to keep going. The subordination of their problem-solving capacity (the mental function which they must now summon into action) to the goal of reaching the next town is clear. The intelligence of these men must now take the form of providing suitable means for achieving their aim.

They climb out of the vehicle and look at it. The chauffeur goes to the left rear tire, feels around it, and shakes his head. Nothing wrong there. He approaches the right back door, first raises and then lowers the window in it, and again shakes his head. Next he runs his hand over the front bumper, kicks it once or twice, and finally says, "Well, I give up."

The friend meanwhile has been silently watching this performance. At last he says, "Maybe you're out of gas." The chauffeur admits he never thought of that, looks at his fuel gauge, sees that it reads "Empty," and remarks, "Perhaps that's it." The two men walk to the nearest filling station, buy a gallon can of gasoline, and pour it into the tank of the automobile. A little further manipulation of the starting mechanism and they continue on their way, the car operating smoothly as before.

This incident does exhibit the use of intelligence, for these men

finally succeeded in modifying their behavior *appropriately*, in altering the external situation accordingly, and in accomplishing their ends. Yet all of us feel that the chauffeur was incredibly stupid, *i.e.*, unintelligent, in seeking the source of his trouble in such unlikely or irrelevant parts of the car. However, he did localize the problem in the car itself and not in the condition of the road a mile back, in the telephone poles at the side of the highway, or in the state of the upholstery. The chauffeur's dullness was still far above the "absolute zero" of intelligence. Nonetheless, we consider his friend a more intelligent person — at least in this situation — because the suggestion he offered was inherently a more promising one. There is a *possible* causal relation between lack of gasoline and a "dead" engine, but none whatsoever between the latter and a windowpane.

**Intelligence as perceptual response.** The intelligent act has many properties which can be correctly described in various ways, but one basic attribute is *fitness to purpose*. The bright person literally does not try to fit a square peg into a round hole without rounding the peg or squaring the hole, whichever act is easier or more suitable to his aims or possible with available equipment. *Inability to perceive such necessary relations among objects is a mark of dullness, i.e.*, of general stupidity if it applies to all or most things, or of limited or specific dullness if such failure to behave adaptively is restricted to a few types of stimuli. Everyone is probably stupid and incompetent with some kinds of material. The real dullard is the one who cannot do the *right* thing, *i.e.*, make the response required by the demands of the situation, no matter what the case may be. Such a person is a pathological rarity.

The intelligent person characteristically discerns resemblances between unlike things (often so different that less intelligent folks miss the underlying kinship) and significant differences where others see only the superficial likeness. This strongly suggests that intelligence itself is merely a refined form of perception. Colloquially we speak of "seeing a point," an expression that is highly revealing of the innermost nature of "understanding." *Insight is a kind of sight.*

Wherever there is an intelligent performance, there is insight; and conversely. Perception, learned achievements, intelligence, and insight — these are not four unrelated activities of the organism but varied manifestations of the identical power to restructure and organize the data delivered to the senses.

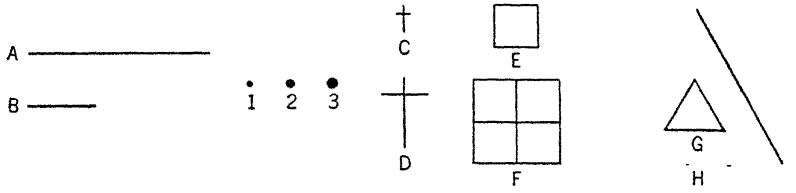



FIGURE 18

Simple visual perception may be used to illustrate this important claim. Examine the objects in Figure 18 and answer these questions:

1. Which is *longer*, A or B?
2. Is dot (1) to the *right* of dot (2)? If so, draw a ring around the dot furthest to the left.
3. Does C have the same *general shape* as D?
4. About how much *larger* is F than E?
5. Does triangle H *lie within* triangle G?

Simple "intuition" or direct perception makes these questions absurdly easy to anyone capable of reading this page and acquainted with the meanings of the key words italicized in the questions above. Items like these are used in testing the intelligence of school children. A question is psychologically like any problem or difficulty; like them it requires an appropriate response, and the degrees, speed, or frequency of "appropriateness" serve as indicators of the intelligence of the respondent. Correct or "right" responses are appropriate ones. The intelligent person is the one who succeeds in producing these reactions not only with the simple patterns just shown but with their *structural analogues* at higher or more complex levels. Thus:

1. Which planet has the greater diameter, Venus or Mars?
2. Did Lincoln die before Bismarck?

3. Which state has a larger area, Georgia or Pennsylvania?

4. Are all mammals vertebrates?

5. Did Germany and Italy in 1940 have essentially the same kind of political organization?

These questions can be put into several forms, but they all become capable of a correct answer only when a reduction to immediate sensory perception is made, or implied by substitute symbols with such certainty that this becomes unnecessary. The intelligent man knows *more* truths and *harder* truths than the one who is not so bright. In order to discover the differences in intelligence among people, all that the psychologist usually does when he gives his tests is to find out how they vary in the *speed* of execution of an insightful task, in the *number* and *variety* of performances they can execute, and in the *severity* of the problems they can solve. These tasks themselves are construed as symptoms and evidence of intelligence in the one who does them.

**Concepts underlying and associated with intelligent behavior.** It should be noted that intelligence cannot be measured or even estimated apart from some definite *achievement* which has been *learned*. Intelligence is not a substance or an entity within the organism — it is merely a *quality* of behavior and should always be interpreted as an adverb or adjective, *i.e.*, as a descriptive term characterizing an action or an actor. This is the reason why information of a miscellaneous sort may serve as an indicator of intelligence, and why the size of a child's vocabulary — *viz.*, pure knowledge of words and concepts — correlates almost as closely with a full test of abstract intelligence as one such test does with another. If the human race were to be divided into upper and lower halves of the general-ability distribution, more individuals in the top half than in the bottom would know *who* Tacitus was, *what* "serendipity" means, *where* Rio de Janeiro is located, *how* to compute the circumference of a circle, *why* breathing is more difficult at a height of three miles than at sea level, *when* Norway was conquered by the Germans, etc. If it should happen that some items of skill or knowledge were done as well or

even better by those independently classified in the lower half of the intelligence curve, the items would be rejected as nondiscriminating and therefore invalid or the groups would be rechecked to make sure that the bright and dull individuals had been correctly segregated. This may appear like circular logic and "padding" the test to favor those who have been defined as intelligent on the basis of other independent criteria — yet this is exactly the standard procedure followed by most test makers.

In one college with which the writer was associated some years ago, the English Department used the percentile scores of its freshmen as reported by the Psychology Department to provide special instructors for the high, low, and average students. Unfortunately these instructors interpreted percentiles 1 to 9 as meaning the superior and percentiles 90 to 99 as referring to the inferior, whereas conventionally the reverse holds. After a few weeks of teaching, they asked the psychologists what was wrong and there was general amusement all around when the error was explained. Obviously, this reveals and confirms one of the great practical uses of a mental test — it discovers in very short order what the less systematic observations of daily life can only unearth in a much longer time.

Since intelligence is usually measured by what one does and knows as compared with what other persons know and do, it is a matter of great weight to discover if an increase in one's performance and knowledge succeeds in raising one's intelligence. On this point intolerable confusion reigns in both educational and scientific circles, although to the present writer the situation seems quite clear. Some investigators hold that any increase in the body of knowledge one has is without effect upon one's prior level of intelligence; a few maintain instead that any additional "mastery of experience" is functionally equivalent to an elevation of the plane of intelligent behavior. This topic is of such fundamental importance that one of the most ambitious Yearbooks ever issued by the National Society for the Study of Education is exclusively devoted to it.[1] We can do no better than

[1] *Intelligence: Its Nature and Nurture*, 39th Yearbook of the National Society for the Study of Education, G. M. Whipple, Editor. Bloomington, Illinois, Public

to center the rest of this chapter specifically around this theme: Can the IQ be raised?

## THE ALLEGED CONSTANCY OF THE IQ

Karl Pearson, the distinguished English biometrician, and many who have followed his thought patterns, have accepted, on the basis of a preliminary analysis, the dogma that intelligence as distinct from knowledge is a congenital character and that it is not a *mutable* quality capable of being molded in any way by the doctor, the teacher, the parent, or any other human and natural agent. This dogma "in good standing" we propose to challenge as both untrue and hurtful.

Formally, the claim that a person's intelligence is fixed and finally determined at conception bears many resemblances to the common assertion that "human nature can't be changed." This general statement, of course, grows out of much experience with the perverse resistance of human beings to certain types of modification; but taken literally it is untrue. If human *behavior* is a part of human *nature* (it is certainly hard to claim the contrary), then it is clear to all but the blindest that man's behavior has altered in many respects not just within the eras required by organic evolution or over long epochs of history, but even within the memory of the living. It may be that these changes are highly superficial ones and that the essentials of our conduct have not greatly altered; but even a *little* change is *some* change. Certainly actions and attitudes on specific matters have noticeably changed. Less than one hundred years ago a majority of the people of the United States approved or accepted the practice of chattel slavery; working-men actually found it necessary to strike to win a 12-hour laboring day; and very few persons thought of man as having any kinship whatever with other organisms. During the war

School Publishing Company, 1940. Part I, Comparative and Critical Exposition; Part II, Original Studies and Experiments. The production of these two co-operative volumes by several dozen specialists was a huge undertaking, but it failed to "settle" the issue that gave rise to it any more than did the equally distinguished volume which preceded it twelve years earlier. However, a clear shift in the direction of environmentalism as a principle of interpretation is discernible; the strict hereditarians are now more on the defensive. The scientific "climate of opinion" seems to have shifted slightly to their disadvantage recently.

of 1914–1918 only a "negligible" number of English conscripts were pacifist or conscientious objectors; by 1939–1940, roughly 3 per cent of most age categories adopted this position. Such changed beliefs do represent serious differences in human adjustments.

All this, however, merely *creates an impression* that the intelligence of an organism *may* change; it does not demonstrate that it does. Throughout the course of an individual life many important changes occur, and what a person's eventual state will be is in part determined by his earlier experiences. No one, for example, can seriously maintain that a man's physical strength is a constant, since almost any healthy male can double his weight-lifting capacity by a few months of judicious bar-bell exercise. Opportunity, intensity of motive, bone and muscle structure, neural co-ordination, sleep, diet, and other hygienic factors all contribute to the outcome. Each of these items should be viewed as a "force" contributing something to the organism's final total ability to lift a 150-pound weight over its head. The accompanying drawing (Figure 19) may be helpful.

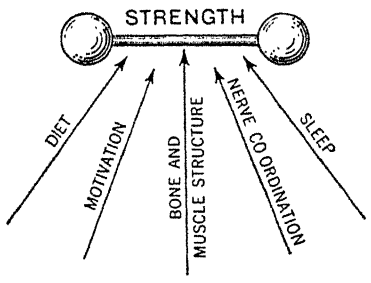



FIGURE 19

The removal of any one of the "arrows" can quickly lead to a lowering of the individual's effective strength whether measured by this weight-lifting test or by any comparable device. It is true that a sturdy boy normally becomes a strong youth and a powerful man. But it would be absurd and utterly false to claim that his absolute or relative strength remained the same at all times. Strength, like intelligence, is a quality or condition that appears in certain acts, and there is little reason to doubt its fluctuating character.

**Necessity for relativistic thinking.** The danger in thinking of any human trait as an unchanging amount is seen in such inescapable attributes of the human body as height and weight. One's weight is certainly not a rigidly invariant quantity; it too is a function of many determiners, such as nutritional habits, exercise, "worry," etc. Every reader of these lines could gain or lose 10 pounds within as many weeks were a sufficient inducement offered. The height of the human organism, once mature stature is attained, is a biological model of stability, but developmental conditions during the first two decades of life do affect the final figure. Since 1850 the average height of the American and Northwest European has increased an inch or two, primarily as a result of the vast improvement in living conditions. The phenomenon has been observed in both sexes and in all groups of the population. The impressive differences in physique between the inhabitants of Northern and Southern India are almost entirely due to the superior diet of the former. Similarly, a literalistic belief that the life span of the human being is definitely confined to 70 years has to yield in the face of increasing average longevity made possible by the financial and emotional security enjoyed by annuitants, improved medical control of diseases of old age, the restorative effects of life in warm mild climates, and similar influences.

Attention to these anatomical and physiological constants assists one in achieving a better perspective upon the alterability of psychological functions. Most mental processes appear to be, and probably are, much more flexible or labile than most of the more overt bodily features, although commensurability is hard to reach here because of the unlike units of measurement we must use. A man's point of view about the national administration is plainly subject to more shifts than the length of his nose or foot! His skill in addressing an audience varies over a wider range than the circumference of his skull. Nonetheless, even the most immovable or unchangeable dimensions of the living system do show some changes and could have been quite different if substantially different growth conditions had been imposed and maintained during the time of maximum increase in size.

It is presumptuous to claim that a minute speck of germ plasm is ever absolutely walled off and insulated from the great Cosmos of which it is a part, or even to maintain that it is in every respect beyond the control of human forces.

**The essence of the IQ problem.** Whether the foregoing paragraphs appear pertinent or not (and methodologically they seem to the writer highly relevant to our problem), they help explain why some educators lean toward a more dynamic view of the IQ as a product of many formative and supporting conditions as contrasted with those who hold a static view. The latter seems to look upon intelligence as a function that is insulated from the rest of the organism's functions, instead of being something that acts upon them and in turn is acted upon. Everything we know about the nature of organic interdependence argues against the assumption that a person's intelligence is once and for all time the same. Evolutionary processes of *some* kind are always going on even during the brief lifetime of a single individual!

It is well to remember that the primary duty of educational psychology is to find ways of improving the human being. Even if certain improvements cannot be made, it is usually worth trying to make them. Raising a child's IQ from 100 to 110 at age 10 is not an enormous change in one sense; it merely means that the child can now do what the *average* 11-year-old youngster can do, instead of doing only what the average 10-year-old can do. There is general agreement that this is a desirable result. Such a difference may eventually mean the margin which separates a junior-high-school graduate from a college graduate. If this difference can be made to appear in most of the school population as the youth of the nation pass through the school system, it might ultimately create the difference between a culture with a high standard of living and one with a mediocre or low one. Since roughly one third of the human population lies between 100 and 110 on the IQ scale, the significance of this upgrading of the entire population can easily be appreciated. The possibility of a change of this magnitude does seem to exist. This is a bold hypothesis and every effort to test it fairly must be made.

The " dogma " of the constancy of the IQ is in some respects less a statistical or experimental problem than a semantic puzzle, but essentially it rests upon the observed fact that if a class of 30 school children is tested on October 1 and again on June 1 of the following year, the mean ratios of the $\frac{\text{MA's}}{\text{CA's}}$ obtained on the two different occasions are very much alike. However, the IQ of a single child may be 98 on one date and 103 on another; the reverse situation is also found. An average may be stable even though the items which produce it are not. In the mass, these " ups and downs " tend to cancel each other, *i.e.*, as many children gain as lose; the differences are explained (or explained away!) by attributing them to random imperfections of measurement, amply covered by a probable error of 5 points in IQ units.

Much of the real constancy of the IQ is an artifact of the manner in which most mental tests are calibrated. The technicalities of statistical computation often hide the psychological realities that lie beneath the symbols in which test results are conventionally reported. If the mean IQ of a random group of children failed to stay the same over the years 3 to 16, it would mean that the tests had been incorrectly standardized for their respective age levels. By definition a child has a mental age of 8 when he can do most of the stunts a representative 8-year-old can do; usually he is also able to do *some* assigned to the year or two beyond his MA and may miss a few of those below his MA; the MA consequently is an average of larger and smaller age " credits." If his CA is also 8, the IQ is 100. At age 12, the IQ is still 100 if the MA does not exceed 12, even though the child is plainly more intelligent in an *absolute* sense; relatively his intelligence has remained the same because his chronological peers have also grown more intelligent at the same rate as he. If for any reason whatever the group norm with which he is being compared should change in that 4-year interval, his own IQ would be different even though his own performances that go to make up his MA are left unaltered. A long-term secular trend toward increasing brightness or dullness in children would not be reported by the IQ as such if the

scales were kept up to date; that could only be ascertained by concrete historical comparisons of specific performances such as finding that the average 9-year-old can do in 1945 what the average 10-year-old could do in 1905. But $\frac{9}{9}$ or $\frac{10}{10}$ both yield 100.

The well-known fact that bright children usually become bright adults and dull youngsters remain dull when they grow up serves to re-enforce the judgment that a person's intelligence adheres to the level on which it started. This is the strongest single empirical evidence in behalf of the constancy outlook. The possibility that in such cases the IQ remains "constant" because the "fields" or developmental conditions out of which intelligence grows have also been kept approximately the same in stimulation value has not been fully examined. That a bright child's IQ remains at exactly 126.5 or a dull child's exactly at 81.7 throughout his school days is an absurdly untenable claim to anyone who has tested a subject and computed his intelligence quotient from the ingredients supplied by the child's answers to the standardized questions of a testing manual. The most that can be maintained is that under ordinary conditions an IQ "area" (as distinct from an IQ "point") can be delimited with a high probability that the subject will continue to make his behavioral adjustments in accordance with the pattern usually found at this *plane* of ability. Thus, Lorge and Hollingworth in a follow-up study of the adult status of 16 highly intelligent children found an $r$ of 0.68 between the first Stanford-Binet IQ of childhood and the last Army Alpha score of early maturity and an $r$ of 0.67 when the long and difficult CAVD scale was substituted for the Alpha. These figures reveal rough *stability*, but nothing approaching true constancy.

To this more modest version of the constancy dogma little objection can be advanced, for it accords reasonably well with the empirical findings of clinical practice. But even this more restrained judgment may involve dangers to the cause of personality betterment if it implies that a radical transformation in the individual's mental hygiene and a thoroughgoing system of social reconstruction which removed all institutional barriers to the improvement of the human

organism would not displace a person from one broad IQ "area" to another. *Small* field changes can be expected to evoke but small IQ shifts; *pronounced* changes in the field forces (which incidentally produce whatever IQ exists at all) must necessarily bring forth larger shifts in IQ. The thermometer similarly rises with the noonday sun and drops with the cool night wind. To deny this is to affirm that the organism and its properties are independent of the world in which they are found and that it leads a wholly self-determined life of its own. Such a view flies in the face of all contemporary science.

Alfred Binet, the father of the modern intelligence-test movement and one of the most creative minds in early educational psychology, had this to say concerning the problem under discussion:

> Some recent philosophers appear to have given their moral support to the deplorable verdict that the intelligence of an individual is a fixed quantity, a quantity that cannot be augmented. We must protest and act against this brutal pessimism. . . . It has no foundation whatsoever. . . .
>
> A child's mind is like a field in which an expert farmer has advised a change in the method of cultivating, with the result that in place of desert land, we now have a harvest. It is in this particular sense, the only one which is significant, that we say the intelligence of children may be increased. One increases that which constitutes the intelligence of a school child; namely, the capacity to learn to improve with instruction.[1]

This citation is worth rereading because it defines a position that the leaders of American educational thought have either neglected or rejected. Binet, to be sure, is only one authority, and distinguished

[1] From the chapter on Intelligence: Its Measurement and Education in Binet's *Les Idées modernes sûr les Enfants*, Paris, Flammarion, 1909, pp. 141 and 146. This important citation seems to have been forgotten until George Stoddard resurrected it and Englished it in the *Educational Record*, supplement for January, 1939, 20, 44–57, in his article, The IQ: Its Ups and Downs. — In this work Binet describes the training procedures he used and the results he obtained with children three years retarded in school. He claimed to have reduced the amount of retardation and reported changes for the better in the alertness, attitude, "looks" of his subjects.

experts in the revision and application of the scales he originated, such as Terman and Leta Hollingworth, have vigorously championed the contrary of this claim. Much of the vast polemical literature on this topic is useless for our purposes, because it is built around a faulty statement or phrasing of the underlying problem; but enough remains that is significant if for no other reason than its revelation of the psychology of the psychologist operating in this domain.

## THE DOMINANCE OF THE ENVIRONMENT

All organisms live in some kind of an environment. This environment is not neutral or indifferent in its effects upon the living creature; survival may depend upon it. A fish out of water does not live long; and human beings cannot live many minutes under water. Life for us depends upon the maintenance of a life-sustaining environment. Saturating the air with carbon monoxide creates an atmospheric environment that is deadly to man. We are so made that without access to water in the desert we perish. Similar examples could be multiplied indefinitely.

The sharp dichotomy popularly established between the organism and its environment is highly deceptive, and the genetic viewpoint must be called in as a corrective. Paleontology suggests, even if it cannot fully demonstrate, that the ancient organisms on this earth were preceded by a nonorganic state. The differentiation of this total primeval environment under certain conditions gave rise to the original organisms to which all past and present living forms can be traced, or perhaps the conditions leading to the emergence of different kinds of organisms were repeated many times. In any event, the " stuff " of which organisms are composed must have been *part* of the environment at one time.

In the life cycle of the individual, the same situation obtains save that we get our start from other organisms instead of being given it by the environment directly; *i.e.*, we begin one step removed from the " raw " environment as such, the parent organism serving as an especially favorable environmental medium in which to develop.

The suckling process represents a modification but still a continuation of this after birth. In a strict sense we never fully emancipate ourselves from our environment; to do that requires that we cut ourselves off from the very sources of our being. The physical and the cultural environments are constantly flowing into us and after some transformation in which they receive the stamp of our "personalities" they are poured out again. This specific interactive process is essential to life itself; in fact, it *is* life. A dead creature, of course, continues to interact with its environment, but there is an impressive difference between the two types of interaction which we need not elaborate here.

Consciousness or direct and noninferred "experience" is but one phase of mental life made possible by our possession of a highly organized bodily system. If the whole upon which intelligence — itself a special function or part of mental life — depends is what it is because of the character of the environment, then how can a piece of this same total fail to be similarly dependent? The race or species is plainly thus dependent; how can the individual fail to be likewise?

These quasiphysical, quasibiological remarks are a necessary prologue to the proper interpretation of the effective role of the environment in furthering or hampering individual development. When we say that personal growth is facilitated, we really mean (in educational and social psychology, at any rate) that it is moving toward goals that we value; when we say it is being hindered, we are employing another way of stating that it is moving in directions that we disapprove. In both instances, change or development is taking place.

**Kinds of environments.** Partly as a result of our biological equipment and partly as a consequence of our cultural heritage (itself traceable to the former), we do not look upon all environments as equal. Some favor our purposes; others are hostile thereto. Although our organism is nothing more than *part* of the environment transformed into an anti- or counterenvironment, the fact that we originated as a selection of forces in a more comprehensive environment may account for our disposition to promote this selective process

either by exposing ourselves to some "friendly" environments and shielding ourselves from hostile ones or by converting the latter into the former wherever our powers permit.

Notice that we have begun to speak of *environments*. The plural form is significant. As soon as one can distinguish at least two environments — a superior and an inferior, for example — the differential effects of the two upon the creatures caught within them become a matter of interest. Indeed, from one standpoint man's entire history may be interpreted as a record of his search for the optimum environment. The polar caps and the scorching deserts are both all but uninhabited because men (and other creatures as well) are hard put to survive in such a setting. The truth of this in terms of large-scale or stable geography is plain, but it is often forgotten when smaller or more "fluid" environments act upon us to foster or to block the emergence of chosen forms of behavior.

Educational psychology concerns itself specifically with the behavior of the young organism in these more circumscribed environments, such as a schoolroom, a family circle, a wall hung with pictures, a library — or even with the greatly "reduced" environment implied in a single book, yet which paradoxically may literally enlarge the reader's horizon or effective environment. An important distinction must be made between a "geographical" environment that is technically or physically present from the standpoint of an observer and the effective "behavioral" or psychologically "real" environment with which the organism is interacting. The latter is the true framework within which mental events occur. A one-year-old may play in a nursery with walls lined with the Hundred Best Books of the ages, but so far as educative stimulation is concerned the shape and color of the volumes is probably all that matters, for the contents are as yet lacking in growth-promoting value to the organism at this age. The environment must be carefully examined in each case with respect to the structure of the stimulating forces found in it, otherwise grave mistakes will be made in appraising its quality. Not every influence in the objective field surrounding a person is active.

Fifty books far beyond a child's mental level are less helpful to his intellectual progress than five that are suitably graded to his needs and capacities. Some parents may exercise a beneficial effect upon their children during the preschool period and lose all positive stimulating value by the time they are adolescent. Many a college professor who is a fine environmental factor in the lives of 20-year-old undergraduates admittedly would be a "total loss" with an elementary-school group. The things in each specific environment from which each organism will gain cannot be determined without detailed inquiry; *e.g.*, certain environments superficially considered harmful, and probably such in most cases, may be rich in meaning to the exceptional youngster. He will extract nothing but good from it; conversely, there are many conventionally approved environments that thwart every fine impulse and distort the personality in a shameful way. The operating pattern of each situation must be clearly perceived before the educative or miseducative effects of each environment can be correctly identified.

## THE EUGENICS PROPOSAL

The bettering of human intelligence may be sought along two main routes, *viz.*, the way of eugenics and the way of euthenics. The first method emphasizes the importance of beginning with the best possible seed or germ plasm, the second of providing the best possible circumstances in which this seed may grow. There is no inherent opposition between these two techniques, for they really serve to supplement each other. It is scandalous for a farmer to take good cattle stock and then neglect them by failing to provide good pasture or exposing them to disease borne by other animals. There is no question but that superior adult organisms are created by selecting those that appear to have a superior hereditary base and providing them with equally favorable opportunities for development.

No educator can be opposed to the eugenical principle of having the next generation born from the best of the present generation, but he must be careful that he is not misled by his inadequate knowledge

of the way the genes and chromosomes behave. A healthy skepticism toward many of the social and educational policies recommended by those who have spoken in behalf of a false or narrow program of eugenics is indispensable, for in the name of science (as in the name of liberty or democracy) many crimes have unfortunately been committed. Even to carry through a minimal eugenics program requires a degree of euthenic reconstruction that has barely begun, *i.e.*, the very possibility of the eugenic solution to the problem of improving the human organism requires a widespread modification of social policies and practices which cannot be made without the utilization of existing educational machinery.

**Possibilities of negative and positive eugenics.** What is termed "negative" eugenics aims at a reduction in the amount of feeble-mindedness by preventing such people from reproducing. With this no one can quarrel since it is no kindness to any child to permit it to be born of an idiotic parent, for even if the offspring were normal, such a parent would hardly be able to provide an acceptable family environment for it. This plan, however, affects but a limited number of people, and these unfortunately are constantly being recruited from the unpredictable results of the mating of apparently normal persons. Poor prenatal care, bad obstetrics involving severe head injuries during delivery, and the consequences of certain bacterial infections of the nervous tissues account for some of the feeble-minded, and these causes can only be combated euthenically. Negative eugenics alone does not contribute much to the elevation of the mean intelligence of mankind, although the little that it can give should not be neglected.

"Positive" eugenics, on the other hand, consists largely in encouraging a higher birth rate among men and women of superior stock. The identification of this superior stock is not easy and many social conditions stand in the way of their rapid breeding even when their relative superiority is quite clear. It is commonly known that the graduates of our "better" colleges are barely reproducing themselves — a fact which suggests that a silent plebiscite among those in the

top 10 per cent of the current intelligence continuum convinces them that, for one reason or another, positive eugenics is for the time being impracticable for them as a group.[1] Many intelligent and well-educated parents sense the futility of most if not all wars, and have little motivation for bringing sons to be eventually slaughtered into a world that has not learned how to keep peace among its members. If by some miracle humanity in the twentieth century could be induced to let only the top 1 per cent of all males in strength, health, longevity, beauty, intelligence, kindness, artistic and scientific capacity, socially useful skills, and other recognized " virtues " become the fathers of all children born after a certain date, there is little reason to doubt that the learning ability and other cherished qualities of the species would be enormously improved. If, in addition, the top 25 per cent of women were similarly selected to have a monopoly of the profession of motherhood, a further boost presumably would be given to the process of upgrading the race.[2] A repetition of this

[1] It is customary in many " hereditarian " circles to lament the fact that the " best " people have the fewest children; yet if this is true, it can only mean that the social environment as such is a dysgenic influence on a grand scale if it leads the good intellects to behave in such a way as deliberately surrendering the future of the race to the dull! The dull who survive will by implication be better adapted to the present type of environment which fosters their procreation at a faster rate than their betters. There is a contradiction somewhere and the answer must be sought in social analysis and consequent social reform. In both America and Great Britain, rural groups average 5 points less in IQ than urban groups, and their fertility is higher. Certainly the remedy is not to make congested and insecure city dwellers breed more? Differential fertility is supposed to cause a decline of 4.4 points in IQ in each American generation, but we may be alarmed about the wrong cause. The excessive birth limitation among the more educated sections of the population is a highly complicated phenomenon not traceable to any single factor. We should all be the gainers if more bright persons were born, but one of the jobs of intelligence is to set the stage so that this happens and also to arrange the situation so that these individuals will *remain* bright once they are born. That this last problem is a real one will become clear in a section below.

[2] To anyone with a little scientific and social vision, the possibilities of artificial insemination as a eugenic device are extraordinarily fascinating. Unfortunately most of us are pathetically lacking in objectivity with respect to this problem and the grip of older but now maladaptive folkways is still too strong. — In the illustration given above, about 10,000,000 men all over the world would at some time or other become biological fathers, on the assumption that one-half of the present population of the earth (about two billions) is male. About a quarter of a

process for a century or so might well ensure the establishment of a super-race and with that the realization of the hopes of educators, psychologists, and other philanthropically minded souls. Unfortunately for them — and for the race — the present representatives of humanity are not ready to adopt this proposal for guaranteeing the good life to posterity. Granted the resistances now governing people's conduct, it would be much easier to establish universal pacifism, democratic socialism, and the reign of the co-operative commonwealth than to realize this particular ideal of positive eugenics. Perhaps these goals will all be reached more or less concomitantly. Meanwhile apart from its great value as a long-term ideal to energize men's present conduct and to prevent them from forgetting their deeper aspirations, the spirit of the eugenics movement is best served by searching for every possible way of bringing to a finer maturity the available germ-plasm material with which the teachers of the nation must work.

## THE MEANING OF AN INTELLIGENCE TEST

The experimental use of certain kinds of controlled environments to raise (or, in some instances, to lower) the intelligence of the persons living under these conditions presupposes the existence of a serviceable and dependable measure of this attribute of our conduct. There is no question that persons who are judged bright or demonstrated to be so independently by other than mental-test methods usually stand high on the paper-and-pencil or performance tests of general ability which psychologists have devised. What made these people bright was not an initial concern of the psychologist. The "intelligence" with which he works is a highly rarefied abstraction; this is nothing against it, of course, since every advanced culture is saturated with abstractions, and one of the favorite definitions of in-

billion selected women, each bearing nine children during the reproductive years — say one child every third year — would be required to keep the world population constant. — The reader may profitably amuse himself with other details of this Wellsian fantasy. Utopias, whether of the eugenic variety or not, do have their educational uses.

telligence is this self-same " capacity for abstract thought." Apparently the IQ tests do measure more precisely whatever it is in a person's reaction which conveys to one the impression that he is able to act competently in most situations. Binet himself originally validated his early scales by asking primary-school teachers to select children considered by them to be of superior, normal, and inferior intelligence. A more objective check is provided by the subjects themselves such as the ability of a 4-year-old child to do as well as most 6-year-olds on the test content. Where this happens, there is no question, statistically at least, that this youngster's mental growth is accelerated when compared to those who are moving ahead at the usual rate.

The separate test items or subtests all have a social or cultural reference in that they *assume approximate equal opportunity to learn these things; e.g.*, it would be plainly futile to ask the average first-grader to define " solder," although a tinsmith's son, because of his specialized contacts and experiences, may have learned it. However, to ask an American child to tell which is a nickel, a dime, and a quarter when these three coins are placed on a table before him is a problem that is presumably common to the experience of all childlren in a pecuniary culture. Test items are preferably built out of these more or less " common denominators " of daily living in our type of society. Unfortunately for the purity of the tests, the assumption of " equal opportunity to learn " them, while frequently sound, is not invariably correct. It is a dangerous myth, particularly in the light of all that we now know about the differences in the quality of the environments in which various parts of the child population are reared. The coin-discrimination test is oddly enough not wholly " fair " to the children of those well-to-do parents who supply their wants by purchasing for them, or " fair " to mountaineers' children whose family economy is largely on a noncash basis; actually it seems to favor metropolitan street urchins. Between cultures widely separated in complexity very few " common denominators " of an intellectual sort exist, although performances on non-language perceptual tests with such universal

objects as the sun, moon, a man's body, etc., can be compared. It would clearly be both unjust and inaccurate to use an American-coin-discrimination test on a Polynesian child: Some analogue or behavioral equivalent would have to be developed to fit his case. Similarly, American children could not be adequately tested on an intelligence measure constructed by a Kamchatka psychologist out of the practices of his culture and his peculiar environment. He might find them extraordinarily stupid by his standards and " norms."

**Application of the notion of " cultural determinism."** What we see so clearly in the case of cultures far apart from each other is often overlooked in the case of the many sharp regional differences within American culture itself. It contains many subcultures, and wholly distinct IQ scales should be standardized for each of them. Since the culture is simply a special kind of biosocial environment, one could even argue the necessity of a special intelligence scale for persons reared and active in recognizably distinct environments. Admittedly every intelligence test is simultaneously an *achievement* test; intelligence cannot be tested except through success or failure with certain selected achievements; and a comprehensive test of scholastic achievement in the specialized sense correlates almost as highly with a measure of IQ as the two halves of an intelligence test correlate with each other! Operationally, anything that increases a person's capacity to achieve, or enhances his actual achievement, also increases his " intelligence," because this is merely the putative abstraction responsible for certain sorts of achievement.

This preliminary analysis of the nature of an intelligence-test score is not designed to minimize its significance. Tests themselves do not mislead; it is their users who are misled when they employ interpretive schemas that do not correspond to the realities of human behavior. An international or anthropological outlook may serve to correct some of the errors of explanation put forth by a nationalistic-minded psychology; a more liberal and democratic approach to the adjustment problems confronting the members of different social categories helps to balance the one which finds the existing stratifica-

tion reasonable and good; and a naturalistic *Weltanschauung* which sees events and things in constant flux offers more possibilities of human control than a philosophy that denies these insights. It is a poor psychologist who fails to recognize that the personal values of scientists dictate *what* they investigate, *how* they carry on their inquiries, the way in which they interpret what they find, and the concrete recommendations they derive therefrom. No matter how passionately they may be devoted to truth, these forces nonetheless are operative in their lives, for it is impossible for any man to divorce himself from his own personality. The educational psychologist can ill afford to neglect this fact — his own field is too rich in illustrations of its significance.

## SOME EXPERIMENTS IN RAISING THE IQ

Having laid a fairly heavy theoretical foundation for the heredity and environment controversy, let us examine a few studies which seem to throw some light on this nature-nurture problem. One of the most spectacular changes ever reported appears to have been made by Trainor. Much impressed by Korzybski and the neosemantic movement in current thought, he gave thirty college sophomores a course of six weeks' training in semantic methods which included not only an analysis of the meaning of words but also considerable attention to applied logic. The Detroit intelligence test was administered at the beginning and again at the end of the training period. His control group made an average gain of 6 score points, but the experimental group — *i.e.*, the one benefiting directly from the semantics instruction — rose 36 points, equivalent to a shift from the 62nd percentile to the 96th percentile on the national norms of this measure. This represents the difference between a mediocre undergraduate and a brilliant student of Phi Beta Kappa caliber. This is an almost unbelievable and certainly unprecedented amount of general transfer from one course; it looks suspiciously like some coaching effect, although even the most skilled cramming school never boasted of such prowess. One is strongly tempted to dismiss the whole report as a

hoax, particularly since no psychologist, no matter how diligent or expert his instruction in that subject, has ever felt that his courses could create a shift of such a magnitude. Yet it will not do to be too hasty in rejecting an important clue; it is entirely possible that a deliberate and specific effort to raise permanently the plane of a college student's intelligence has not succeeded largely because it has not been tried, or tried with suitable techniques and appropriate content.[1]

At an entirely different level is a modest study by Otis, who appears to have wondered whether a group of "feeble-minded" girls in a state school had really reached their ultimate intelligence level. The average age of these young women was 24; their median IQ was 68. Twenty-five of them were induced to join a reading club and to make written reports of the books they read. Motivation was intensified by issuing a certificate to each person when five books were completed. The IQ gain of 15 girls who received 5 or more certificates was 7.2; the IQ increase of 10 who secured from none to four certificates was 5.6. One wonders if they had gone through the famous five-foot shelf, whether the progressive rise in IQ with additional volumes would not eventually have brought them to the point of qualifying for admission to Radcliffe College! One's confidence in this pleasant outcome is somewhat spoiled by learning that 15 girls not in a reading club made a gain of 4.8 points. However, the gains made by these bookish morons were genuine enough to affect what they did on the Stanford revision of the Binet scale. Important, too, is the apparent demonstration that the IQ may be raised after the age of 16, often presumed to be the chronological limit of mental growth.[2]

A similar but technically more finished inquiry by Kephart points

[1] See V. C. Trainor, Experimental Results of Training in General Semantics upon Intelligence Scores, *Papers from the First American Congress for Semantics* held at Ellensburg, Washington, 1935, pp. 58–67. Needless to say, this astonishing result is sorely in need of extensive checking. Many crucial repetitions and confirming experiments of this sort would be needed before the specific power of semantics instruction could be accepted and presumably imitated.

[2] M. Otis, Improvement of Feebleminded Girls over 16 Years of Age, *Journal of Applied Psychology*, 1939, 13, 301–315.

in the same direction of test improvement following a period of intellectual stimulation. Sixteen boys aged 15 to 18 with a mean initial IQ of 66.3 (range, 48–80), all residents of a "self-governing" cottage in a training school, were subjected to a special program of constructive activity which provided informal training in the solution of abstract problems by requiring each participant to work out for himself a rational solution to various individual and group problems as these were encountered. The report maintains that stress was laid not on the quality of the finished product but on the production of original means for reaching a definite end. The effect of this "atmosphere" was presumably reflected in the mean IQ eighteen months later; it was then 76.4 instead of 66.3, representing a gain of 10.1 points. Only one boy lost; the positive changes of the rest ranged from 2 to 22, 81 per cent making a gain of more than 5 points (noted here because a change in either direction of less than this amount is commonly considered of no significance).[1]

**Other efforts to lift low IQ's.** Binet's earlier work with "slow learners" had brought out the fact that these children made progress in self-improvement whenever the following conditions prevailed:

1. The needs and desires of the learners were known.
2. Their relative status was known to them.
3. They were convinced that their performance could be changed through their own efforts.
4. The learning program was characterized by a progressive shift from easier to harder tasks.
5. The procedures were adapted to the personality of each child.
6. Friendly relations between teacher and pupil prevailed.

These apparently are the minimal conditions for securing positive results in IQ raising. Each separate "factor of advantage" appar-

[1] N. C. Kephart, Possibilities for Influencing the Rate of Mental Growth in Retarded Children through Environmental Stimulation, *39th Yearbook* of the National Society for the Study of Education, Part II, Chapter 13. The heart of his technique appears to have been a clever use of social approval in promoting choices and enhancing motivation.

ently contributes something; as the number of favorable pedagogical factors is increased and all of them are effectively combined into a workable pattern, the outcome should be more and more impressive. Such an assumed effect at least does not appear to be wholly unreasonable.

One more sample of good results with a group hitherto considered quite "hopeless" appears in Risden's account. A summer program of training was arranged for 20 children diagnosed as scholastic "misfits." Their mean IQ was 77 (range, 64–86); their life ages, 10 to 13. Their wants were analyzed after numerous detailed observations and a set of activities designed to fit these needs (and incidentally to stimulate intellectual responses) was planned and executed. Following this short season of specialized work, a *median* Stanford-Binet gain in IQ of 5.5 points was registered; the range of increase was from 0 to 20 points.[1] One is forced to wonder why some of the pupils exhibited little or no improvement and others made somewhat astonishing gains. We do know that this is what occurs, for it has been confirmed repeatedly. The same "general" environment does not mean the *identical* environment for all — in a sense, everyone's environment is unique — and even if it did, the stimulation value inherent in it is not the same for all organisms because even those pupils with identical IQ's do not bring the same total nature to the learning situation.

**Changes where the IQ is initially above average.** Another type of investigation on IQ upbuilding usually involves a group as favored intellectually as the institutional cases reported above are handicapped. Nursery-school children, for selective and social reasons we need not enlarge upon here, commonly have better than average mentalities. Yet these youngsters apparently also make noticeable gains in their IQ's as a result of these preschool programs — gains that are over and above what might be made without the benefit of such

[1] G. A. Risden, *An Exploratory Study in Education for Slowly Developing Children*, Ohio State University Abstracts of Doctoral Dissertations, Columbus, 1937, No. 24, 279–290.

attendance. Some of the bitterest debates in recent child and educational psychology center about the reality of these effects; a group of investigators at the University of Iowa insist upon their genuineness, while many others deny the authenticity of these findings or account for them in ways unfavorable to the improvement hypothesis. The history of this dispute is long and involved; many of its details may profitably be omitted; but the essentials seem to stand out very clearly.

Small children who attend a nursery school are presumably exposed to more sights and sounds, brought into contact with a greater variety of young personalities, and encouraged to engage in a wider range of activities than would be the case if they remained in and about the ordinary neighborhood home. If one assumes that the height to which one's intelligence grows is in *part* a consequence of experiences that serve to lift the level of behavior of which one is capable, then the nursery school should give some evidence on this point. Wellman declares that 228 children in the Iowa City preschool laboratories with an average age of 40 months and a mean IQ of 117.3 in the fall rose to a mean IQ of 124.3 in the spring, a clear gain of 7.0 points; in the fall of the second year of nursery school, these same children began with a mean IQ of 123.9 (indicating that they held the gain of the preceding year) and grew to a mean score of 127.7, or a net gain in about 20 months of supervised living of more than 10 points. This should be compared with the very similar figure reported by Kephart (see before) for older children much lower in the brightness scale. Regardless of the level at which the subject population starts, real increases seemingly can be accomplished by specialized instruction.

Whatever the reasons, most investigators at other institutions have not been able to duplicate Wellman's results, and this has led to much skepticism concerning the Iowa researches. Some of these antagonistic criticisms, particularly as they touch upon statistical minutiae and the lack of neatness in experimental design, are at least partly justified; but it is nonetheless conceivable that the Iowa

group has hit upon something which has escaped the rest. Such a judgment, however, must be postponed until the case for IQ lifting has been more fully presented, since it obviously does not stand or fall on the basis of the nursery-school experiments alone.

**Absence of specific nursery-school effects on mental level.** One of the most careful of the many nursery-school researches comes from L. Dewey Anderson who made a longitudinal study of the effects of nursery-school training on successive intelligence-test ratings. He paired child by child nursery-school and non-nursery-school groups at five years of age, matched the members of each group according to initial IQ, sex, parent education, and socio-economic status. His disconcerting results are given in Table V.

*Table* V. *IQ Averages for Nursery- and Non-nursery-school Groups at Six Test Ages, Three to Six Years* *

| Group | Semesters in Nursery School | *N* | 3 | $3\frac{1}{2}$ | 4 | $4\frac{1}{2}$ | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| I | 5 to 6 | 19 | 113.57 | 116.37 | 115.47 | 121.00 | 116.47 | 117.21 |
| II | None | 19 | 113.47 | 112.95 | 114.89 | 115.89 | 115.89 | 118.05 |
| III | 1 to 2 | 20 | | 115.90 | 115.15 | 117.20 | 117.35 | 116.35 |
| IV | None | 20 | | 113.65 | 117.85 | 115.95 | 117.40 | 117.00 |
| V | 3 to 4 | 11 | | | 121.82 | 120.36 | 119.00 | 116.18 |
| VI | None | 11 | | | 119.73 | 118.91 | 119.18 | 114.27 |
| VII | 3 to 4 | 14 | | 122.50 | 123.60 | 122.93 | 126.14 | 122.14 |
| VIII | None | 14 | | 124.86 | 125.07 | 123.79 | 126.00 | 126.00 |

* *39th Yearbook* of the National Society for the Study of Education, Part II, p. 9. Quoted by permission of the Society.

At first blush this seems to dispose fully of the Iowa claims, but on second thought, one wonders if these records do not prove too much. Willard Olson, commenting on a similar bewildering outcome of a study of his in this field, offers these remarks which also apply to the Anderson experiment: [1]

The analysis has failed to find any conclusive evidence for growth changes related to nursery-school experience in this privileged group

[1] *39th Yearbook* of the National Society for the Study of Education, Part II, p. 244. Quoted by permission of the Society.

of children. One might argue on theoretical grounds that the home nurture for these children was already so nearly optimum, irrespective of nursery-school attendance, that further stimulus and regimen could not be expected to alter the growth curves in mentality or other areas. Where children are living under some degree of deprivation, additional nurture might more nearly permit the realization of potential growth in achieved growth. Such demonstrations must come from experiments with other types of children.

Any matching that equates children for parental education and socio-economic status may be holding constant (and thereby statistically eliminating the effects of) the most important things that count in raising a child's IQ, particularly when both "experimentals" and "controls" are as highly favored as these appear to be if one may judge from the mean scores. Under such circumstances, the nursery school is important for its nonintellectual, *i.e.*, "socializing," benefits

*Table VI. Changes in Mean IQ on the Minnesota Preschool Test after One Year of Nursery-school Training, Compared with Changes for Non-nursery-school Children after a Year's Interval* *

| | Nursery | | | Non-nursery | | |
|---|---|---|---|---|---|---|
| Months Old at Test 1 | 0 to 29 | 30 to 59 | Total | 0 to 29 | 30 to 59 | Total |
| Cases | 26 | 58 | 84 | 40 | 82 | 122 |
| Test 1 | 108.8 | 111.9 | 110.9 | 105.5 | 108.4 | 107.6 |
| Test 2 | 115.0 | 115.7 | 115.5 | 109.3 | 113.8 | 112.2 |

* *39th Yearbook* of the National Society for the Study of Education, Part II, p 169 (abbreviated). Quoted by permission of the Society

only. That such would be the case with a population of mean IQ 90 is doubtful. Where superior subjects are involved, the nursery-school attendants must be acquainted with "pacing" methods of developing insights which *might* lift the "superior" into the ranks of the "very superior," since even the gifted are probably subject to some psychological deprivations. Doing essentially the *same* thing for all the youngsters, regardless of the level from which they start, is probably not sufficiently challenging to promote growth into the higher IQ categories. The IQ level of the teachers in charge in supplying

*differential* stimulation may play an important role in determining the outcome where their charges are concerned.

Much the same remarks apply to the investigation of Goodenough and Maurer, the substance of which appears in Table VI. Here it is interesting to note that the two groups made precisely the same average gain, *viz.*, 4.6 IQ points, which the authors interpret as a practice effect due to the experience of taking a test. This seems like a reasonable explanation, but one is still left with the question: Why is the usual nursery-school routine, even when patterned after avowedly "progressive" methods, so lacking in vigorous intellectual results? Is there nothing in the situation to help the children sharpen their wits?

**Intellectual consequences of severe deprivation of stimulation.** To answer these questions, more drastic changes in the "goodness" of the environment for growth-promoting purposes must also be investigated. Inquiries of this type have been effectively assembled by Skeels.[1] The changes in IQ of children who are transferred from inferior to relatively superior home environments cannot be said to support the concept of intelligence as a fixed or unmodifiable feature of the personality. This extreme position is clearly wrong. What is still uncertain is the amount of IQ change that can be induced. Is this small, extending at the most five points up and down the scale? Or is it potentially sizable, rising or falling as much as 30 points, depending on the quality of the milieu in which the organism must act? Perhaps it is a matter of the intensity of the forces applied. In the physical world, certain substances undergo little or no change when the pressure or charges with which they are bombarded are slight; but when more powerful energies are brought into action, the atoms break down and the substance is converted into something else. In the same way, "weak" stimuli may leave the organism unaltered, whereas those that penetrate well into the nervous system *may* modify the general pattern of the organism's responses.

[1] *39th Yearbook* of the National Society for the Study of Education, Part II, Chap. 20.

A change of this order of magnitude appears to have occurred in the case of 80 illegitimate children who were placed in above-average adoptive homes early in infancy. The mean IQ of the mothers was 87.7, and judging from the occupations of the presumptive fathers, the paternal median was not much above this. Nonetheless, the mean IQ of these children at an average age of 4–4 was 111.5, the only plausible explanation of this sharp difference being the provision of beneficial home surroundings by a better type of foster parent. Seemingly the mental level of the true mothers was less decisive in creating the final result than the occupational status of the foster parents in which these children were placed. Skeels maintains that this puts the responsibility for the development of the young child on the home to a degree rarely appreciated. Table VII helps to visualize these relations by consolidating the findings of several independent investigations.

*Table* VII. *Effect of Placement in a "Good" Foster Home of Children Born to Mothers of Low Intelligence* *

| Author | Mothers' Mean IQ | Number of Cases | Age Placed | Mean IQ of Children |
|---|---|---|---|---|
| Freeman *et al.*..... | "Defective" | 86 | Before 5 years | 95.1 |
| Speer..... | 49.0 | 12 | Before 3 years | 100.0 |
| Skeels..... | 61.6 | 9 | At 6 months | 112.0 |
| Skodak..... | 66.4 | 16 | At 3 months | 116.4 |

* From George S. Speer, p. 313 of the *39th Yearbook* of the National Society for the Study of Education, Part II. Quoted by permission of the Society.

Some figures by Gertrude Hildreth in the same volume (p. 179) are of great interest because they appear to support a position antagonistic to Speer's interpretation. She found that the median IQ of 103.3 of 54 adopted children enrolled in the Lincoln School of Teachers College, Columbia University, was more like that of the general population than like that of the average pupil in this excellent private school (median IQ = 120.3). Apparently the combination of a superior home (?) and a superior school (yes!) environment was unable to raise these adopted children to the plane usually achieved by own children from a parental group of this socio-economic level. Unfortunately the IQ of the real parents, age when adopted into the foster home, and other essential information are missing. If the mean parental IQ of these adoptees was about 90 (a not unreasonable guess in the light of what we know about the sources of adoptions), then a presumptive rise of more than 10 points is far from discouraging to the environmentalist. Without the benefit of adoption, it is assumed that the mean IQ of these adoptees would hover around that of their putative parents.

Evidently the Binet scores of these adopted children are inversely related to the length of time they had to spend under the tutelage of

their dull mothers. The sooner they are freed from this unfavorable set of controls, the higher they are able to go in a more suitable setting.

If intelligence — or the test score presumably symptomatic of it — can be made to go *up*, it can also be made to go *down*, if the growth or stimulus value of the environment is sharply reduced. Such a shift in IQ level, when made as a result of conditions regulated by the experimenter, has the significance of an *experimentum crucis*. In one of the Iowa series of researches, a small group of a dozen children with a mean IQ of 86.7 were sent to live in what is described as an average orphanage. "The outstanding feature was the profound lack of mental stimulation or experiences usually associated with the life of a young child in the ordinary home. Few contacts with adults were possible other than those involving physical care, because of the large numbers of children and the limited staff." [1] After a lapse of time the mean IQ had dropped to 60.5, a decline of 26.2 on the average. One child lost as much as 45 points! In the name of humanity one is tempted to cry, "Enough. You've proved your case. It's hardly necessary to add more cases or to repeat the inquiry in another locale, with other tests, different investigators, and different subjects. The business of education and its auxiliary sciences is to improve people and not to aid in their deterioration." [2]

[1] Clinicians are all but unanimous in agreeing that if a child has at least one adult who is genuinely interested in him and with whom he can exchange experiences on a fairly intimate plane, this process exercises a constructive influence on the growing personality. The absence of this "warmer" sort of relationship was one of the principal defects of the older type of eleemosynary institution. It used to be thought that these undesirable effects were restricted to the emotional or temperamental aspects of the orphan's life, but it now appears that the general mental level likewise deteriorated under such a regime.

[2] Many possible experiments in the field of human behavior are not made because the investigator is restrained by either his own or others' sense of obligation to the rest of mankind. Researches are, or ought to be, made for the purpose of ultimately advancing human welfare. Vivisection itself is barely tolerated because it seems to be a necessity if our own species is to be served; but deliberate human vivisection is criminal. However, we unwittingly tolerate an unknown amount of behavioral or psychological vivisection from which countless subjects suffer.

## INDIRECT EVIDENCE CONCERNING THE DETRIMENTAL EFFECT OF A "DEPRESSING" ENVIRONMENT UPON IQ SCORES

Certain "backwoods" areas of the United States are interesting in connection with this problem because they show without exception that the older children in these communities are duller than the younger. Normally, the IQ of an unselected population at age 5 is 100; it is also 100 at age 12, and at all years in between. In any reasonably populous and long-settled county, 100 10-year-old children taken at random will be no brighter (in the sense of having a higher IQ) than a similar representative sampling of 7-year-olds. The difference in mean intelligence between a sample of first-born children and those who are fifth in birth order is a vanishing amount, provided these siblings are tested at the same life age.

The performance of children of different ages in various Southern Appalachian districts lends some very substantial support to the field theory of intelligence. Thus, Wheeler[1] who tested 1,147 public-school children in the isolated mountain areas of Tennessee found a progressive *decrease* in IQ on the Dearborn scale with added years. At 6, the median was 94.7, but it dropped more or less steadily until at 16 it had sunk to 73.5. It would seem as though the home, the school, the church, and whatever other cultural institutions operate in those cabin communities conspired to produce a state of "trained incapacity" or artificial stupidity. Certainly the older brothers and sisters are not that much more dull than their younger kin because of any special hereditary handicap that has struck them and passed by the others. The progressive decline with each school year argues against such an interpretation; on the contrary, the younger children, who are nearly normal when they begin school, will probably be near-morons when they are ready to leave it. The primitive school practices in these districts are unable to compete in achievement with

[1] L. R. Wheeler, The Intelligence of East Tennessee Mountain Children, *Journal of Educational Psychology*, 1932, 23, 351–370.

the work done elsewhere and the result appears in the poor showing of these pupils when they are matched with national norms and standards established under better conditions of instruction.

Sherman and Key, operating in different but similar regions, reached the same conclusion. It is difficult to see how their data could permit them to arrive at any other judgment when one considers their findings. The Pintner-Cunningham test given to children between 6 and 8 yielded an average IQ of 84; between 8 and 10, one of 70; between 10 and 12, one of 53; the National Intelligence Test IQ dropped from 66 or 67 between 10 and 14 years of chronological age to 52 between 14 and 16. The authors state that the steepness of the drop was associated with the degree of isolation of the community, *i.e.*, its inaccessibility and distance from any cultural center.[1]

A later inquiry by Edwards and Jones on 247 mountaineers in North Georgia points to the same generalization.[2] The mean IQ at

[1] M. Sherman and C. B. Key, The Intelligence of Isolated Mountain Children, *Child Development*, 1932, 3, 279–290. These "hollow folk" children seem to start their retrogression about the 7th year. Until then they differed from each other in the usual sense that some were noticeably bright and some noticeably dull. Thereafter, these differences diminished in the direction of uniform dullness. While Sherman's statement that all became dull is a bit strong, such no doubt was the tendency. The dependence of "advanced" intellect upon group stimulation seems clear in any case.

[2] A. S. Edwards and L. Jones, An Experimental and Field Study of North Georgia Mountaineers, *Journal of Social Psychology*, 1938, 9, 317–333. — The relation of mental retardation in school children of the South to the frequency of hookworm infestation is also important here because the most striking clinical symptom of this disease is mental sluggishness. Smillie and Spencer studied white rural youngsters in southern Alabama of similar socio-economic status and found that variation in the intensity of hookworm infestation was paralleled closely by changes in the mean IQ scores on three group intelligence tests. Thus, pupils with a negative count had a mean IQ of 90.2; those with 1 to 25 worms, an IQ of 88.3; those with 26 to 100 worms, a score of 86.4; those with 101–500 worms, a score of 84.1; and those between 501 and 2000 worms, a score of 76.3. Infecting a pupil with the hookworm is apparently a clear-cut way of lowering his learning ability. *Cf. Journal of Educational Psychology*, 1926, 17, 314–321. However, Donald Paterson argues forcibly for the opposition view. "The fact that parents of low social status are apt to produce offspring with inferior mental status, and, at the same time provide unsuitable sanitary conditions predisposing such children to hookworm infection requires us to hesitate before asserting causal relation where

age 7 was surprisingly high, *viz.*, 108; but by the time the group 15 years and older was reached, the mean IQ had fallen to 70, an average drop of 38 IQ points from the 7-year level. Educational deprivation in the broadest sense appears to be the only factor in the situation to account for this fall.

## ANSWERS TO SOME OBJECTIONS

Unless one adheres to the improbable view that the same gross statistical error vitiates all of these mutually reenforcing studies, it is hard to deny that the IQ is like a thermometer which gives lower readings when the "energy content" of the surrounding environment is lessened, and higher ones as this same environment becomes more strongly "charged." [1] It is significant that the strict hereditarians attack — with some justice, it must be confessed — the mechanics or craftsmanship of those researches which bolster the case of the environmentalists, whereas the latter concentrate their fire on the hidden postulates of their adversaries which are said to mar even the most finished of inquiries. The subtle but often fatal errors due to the inaccuracy of assumptions are easily neglected, for they cannot be estimated and evaluated as precisely as errors of measurement and errors of sampling.

Those who reject the possibility of improving the intelligence of

---

mere association (the correlation between hookworm 'density' and IQ is −0.30), and slight at that, may be all that the available evidence discloses." *Physique and Intellect*, New York, Appleton-Century Co., 1930, p. 197. Unfortunately, there are no figures on what happens when hookworm victims are treated, cured, and placed in a superior environment. Even if the IQ scores did rise, as seems probable, it is doubtful whether this would persuade the unbending hereditarian who finds comparable experimental evidence unconvincing.

[1] H. D. Carter's exhaustive summary of a decade of research on twins leads him to this important conclusion: "The studies of identical twins reared apart have shown that drastic changes in the environment may be associated with corresponding mental differences to the extent of 15 or 20 points of IQ. (*39th Yearbook* of the National Society for the Study of Education, Part I, p. 240. Quoted by permission of the Society.) Nothing more need be admitted to encourage the search for manageable techniques of *permanently* elevating the IQ regardless of the level at which it is found. *Temporary* reduction in IQ scores has been produced by 20 grams of alcohol, but the same effect can be produced in many other ways.

an individual after birth do not deny that it may deteriorate greatly as a result of direct injury to the cortical substance. But even these cases exhibit a recovery effect, owing either to "natural" restorative processes or to the helpful results of reeducation; *e.g.*, language habits that have been destroyed by the wound may either return spontaneously or be reestablished by fresh training. In either case, the organism's intelligence *as tested* or revealed in behavior is of a higher order than before. It is futile to contest the claim that intelligent acts — and all human reactions — "are an expression of the way in which anatomical structures function *under specific conditions*." The crucial point is just this: The nervous system as an anatomical structure does function better when certain forces are brought to bear which change its properties. The importance of brain tissue lies in its very changeability and not in its unmodifiability — by altering it one necessarily changes the organism's behavior as well. An improvement in the general "tone" of the cortex which enables it to approach every adjustment-demanding situation with greater *alertness* than before is the presumptive organic basis of a rise in IQ. This is essentially what is meant by an increase in intelligence.

One of the favorite definitions of intelligence is "the capacity to learn," *i.e.*, the innate possibility of learning. Some persons have rich possibilities, others poor ones. But how do we assess the magnitude of this potentiality? Only by what one has learned. An organism need not have learned much for us to arrive at some estimate of its possibilities, but it must exhibit some achievements of different qualitative levels. The hereditarians evidently make the mistake of assuming that every IQ potentiality has been translated into actuality at the time a child is tested, and that if it does not manifest itself, then it simply isn't there to come out. However, if "more" does appear later, it must mean that there were unexpected possibilities in the person. We can never be wholly sure what is potential in any individual until it appears; in this respect we must work largely by hindsight. No psychologist can observe and test a new-born babe and say that he foresaw its eventual attainment of a 200 IQ — its po-

tentialities at that early date are largely hidden from view. Later, when there is more achievement "stuff" to assay, he can make a better prediction.

Formally, the future behavior of every personality is latent in his own nature and in the nature of the world about him. But it is only as these inner and outer forces combine fruitfully that any kind of human performance is possible. Broadly conceived it is the task of education to provide these "outer forces." If intelligence is never *fully* measured in the normal adult save through the medium of socially acquired knowledge and skills, how can that intelligence be quantified properly when opportunities to learn are so inequitably distributed? Intelligence may be thought of as that quality of mind which sets limits to achieve *under a given set of conditions, i.e.*, which makes it possible for the individual to progress so far and no farther *as long as his development is confined within a certain frame or pattern.* Even under the worst learning circumstances, some individuals become (or are) brighter than others, and under the best some are duller than others. But *all* may become "brighter," *i.e.*, do better in general, as the structure of the field that embraces them is improved. The limits of the organism are then correspondingly extended, because its specific behavior (of which intelligence is a part) is a function not merely of itself but of its surrounding milieu. This "double-aspect" and "interactionist" theory of intelligence is the one for which this text pleads.

**Terman's criticism of technique.** The most effective attack upon the Iowa studies, which are the principal and admittedly somewhat unsatisfactory research support of the current environmentalist hypothesis, has been made by Terman who prefers the nativist position. He says: "'Favorable' data are taken at their face value when alternative explanations are obviously possible in terms of such factors as selected population, statistical regression, practice effects, subject rapport, examiner bias, unreliability and standardization errors in the intelligence scale used, shift from one scale to the other in retests, or the doubtful validity of intelligence scales for infants." These are

the essential objections raised to most studies reporting a rise in IQ, although the use of unsound statistical procedures in treating the raw data is also held to lower their scientific value.[1]

That many of these specific defects exist may be admitted, but the critique made in these terms is not as devastating as may appear at first sight. These real flaws probably do not affect the heart of the argument. Consider first the "selected population" point. Any sample of ability which does not approximate the Gaussian or normal probability curve is "selected" in some way. But it is not necessary to have such a group to show that the IQ can go up. If it can be made to rise with subjects from the lower end of the distribution *and* with those from the upper end, that is a sufficient demonstration of the effect. When the laboratory first demonstrated that simple motor-manual reaction time to a visual signal is longer than to an auditory signal, no random sample of the population of Leipzig served as subjects.

The regression phenomenon refers to the empirical observation that when children are retested with tests not completely reliable — and no mental test is that — those of high or low IQ will tend to move slightly toward the mean of the second testing, *i.e.*, those initially high will be less high and those initially low will be less low. Such a regression toward the center from both extremes, however, does not explain a *mass* upward or downward movement of an *entire* population; neither is it right to attribute all upward and downward shifting of individuals in *any* group to this peculiarity of all tests.

Practice effects arise because no organism can approach the same situation twice without exhibiting some effect caused by the first experience. Children may become "test-wise," *i.e.*, more confident, less shy, and less inhibited during an examination situation, particularly if they are measured often and by different testers. However, matched or control groups are the best available answer to this difficulty. The effect of a specialized environment will then appear in

[1] Page 461 of the 39*th Yearbook* of the National Society for the Study of Education, Part I. Quoted by permission of the Society.

the differential gain over and above that attributable to acquaintance with the testing situation as such. Exact matching, of course, is hard to achieve; but since overmatching and undermatching occur equally often, such errors are self-balancing so far as the all-important group mean is concerned.

The subject's rapport with one examiner may be close, thereby affecting favorably his speed of response, willingness to expend effort, etc.; he may, however, be out of touch with a different examiner and be disinclined to work in his presence. If rapport is consistently poor on Test I and consistently good on Test II, a spurious record of IQ jump may be secured. Such motivational effects are theoretically of great interest to the environmentalist and it is a bit odd to have them emphasized by the nativist. However, an experienced tester is sensitive to variations in rapport and aims to conduct the examination only when this factor is favorable. Unless one assumes that the rapport was predominantly poor on one occasion and predominantly intimate on the other, it is hard to see how this feature alone would explain the improvement in IQ.

"Examiner bias" is a possibility in every experiment when the tester knows what the larger purpose behind the inquiry is. A certain kind of "halo error" may result from a knowledge of the child's standing on an earlier test or from other information which predisposes the examiner to expect him to behave in a definite way. Since some item scoring is subject to the examiner's judgment and since his approach to the subject may weight the expected reply in a certain direction, this difficulty can best be forestalled by using on the critical occasions examiners who are unaware of the problem being studied and who are ignorant of the specific environmental stimulation to which each contrasted group has been exposed.

Unreliability and standardization errors in the intelligence test that is used to indicate changes represent a mixture of variable or "accidental" and constant errors. The former type, usually covered by the "probable error" of measurement or some allied deviation unit, is commonly considered to have little if any effect upon a group

average. A "constant" error, on the other hand, because it consistently reports a magnitude as greater or smaller than it really is, is apparently more serious. Thus, a given scale, because its norms have been established by faulty sampling, may falsely assign a certain performance to the 8-year mental level when it properly belongs to either the 7th or 9th year. But a tester who is using the scale for experimental purposes could hardly be misled by this, since the scores of the parallel groups or of the same groups tested on a "before-and-after" basis — whichever system were used — would both contain the same constant errors. Hence they would not affect the legitimacy of any comparisons since both sets of scores would be equally affected by the same handicap.

Superficially, a shift from one test of intelligence to another (of the same general sort) on the retests is hard to justify, but the case for IQ improvability does not stand or fall on this point alone. After all, there are a number of scales constructed on similar principles now in existence from which an IQ can be computed. It should be, and is, possible to use either the Herring or the Kuhlmann scale in securing *an* IQ measure; the Stanford revision of the Binet scale is merely the most widely used and the most convenient. One cannot maintain that Scale A gives a truer picture of the *real* IQ than does Scale B. It is considered good research practice to use equivalent forms of the same achievement tests in those situations where one wishes to eliminate or to reduce the effect of practice, upon which we commented a few paragraphs before. To measure at the start in inches and at the end in centimeters is not a matter of grave concern, if the two units are mutually convertible; if they are, any change (or lack of change) can be detected as readily by one set of measurements as by another, provided only that they are appropriate to the magnitude involved. Unfortunately for both sides of the argument, it seems that we are forced to use yardsticks that are either inherently or for the time being quite "rubbery" in nature. The scales and measures by which a basic theoretical question must be tested do not themselves "stay put." For instance, 66 children in the IQ range 100–110

on the Merrill Palmer instrument averaged 104 on it and 118 on the Binet, a positive increase (apparently) of 14 IQ points. Yet children with an average Merrill Palmer score of 153 have a mean Binet of 138, involving a presumptive loss of some 15 points. Contrariwise, if the children are classified on the Binet basis, those with an average Binet score of 154 have a mean Merrill Palmer IQ of 135, thereby registering an artificial statistical loss of some 19 IQ points. All this is very bewildering to both expert and amateur and indicates that the basic " terms " of the problem are sadly confused.

That intelligence tests for preschool infants are not as satisfactory as those for the latter years of elementary school is true enough, but the effects upon the validity of data purporting to reveal IQ differences are probably similar to those produced by " accidental " errors, *i.e.*, the relative brightness of some children is exaggerated as much as that of others is minimized, but again the averages of groups — on which the thesis of improvability really rests — are barely affected thereby. Diminished validity does its worst harm when wrong *individual* diagnoses are made; its effects in groups are slight.

Other limitations of the pro-environmentalist researches exist, but the above criticisms are the chief ones that have been advanced. Almost all of them, curiously enough, could apply to any experiment dealing with behavioral changes during a stated time interval; specifically, the cap also fits those fairly numerous nativist studies which show no improvement in IQ as a result of nursery-school attendance. Even if these were unanimous in indicating no increase — which they are not — this would not mean that such an increase was forever beyond the bounds of possibility; it would merely mean that we had not discovered the control of those forces which give to phenomena the properties they have and which make their very being possible in the first instance. In psychology, as in chemistry and several other sciences, an excellent way to find out more about the qualities of the thing with which one is dealing is to try to change it into something else and to observe its differential behavior in the presence of other things.

## RELATION OF MOTIVATION TO THE IMPROVEMENT OF INTELLIGENCE

That aspect of our behavior which we call intelligence does not operate independently of other organismic processes such as emotion or feeling with which it is frequently contrasted. The nature of these attributes of conduct and the complex unity and interrelatedness of all bodily functions make it evident that the connection between all psychological spheres of activity is a very intimate one. It is almost an axiom of contemporary psychology — at least of the psychology developed in this book — that no one factor determining behavior or development is entirely independent of the other factors. This interaction among the various mental functions or parts of the system is of the same order as the more general interaction between the total living system and its environment.

Curiously enough, very few growing individuals have ever been strongly and directly motivated toward an increase in their own IQ's. This can be made a specific goal only by making it attractive in some way. Many have sought to acquire specific skill or knowledge, some of which has undoubtedly contributed in a circuitous way to an improvement in the measured IQ. Thus, we may assume that anyone who feels impelled to read an encyclopedia or an unabridged dictionary as a pastime can hardly fail to do better on a standard intelligence test than one not so disposed. Too much of the actual content of mental tests is taken from just such sources as these for the effects to fail to appear. Other things being equal, the achievements of a person strongly motivated are greater than those of one feebly motivated. It is even possible that an additional supply of $x$ units of motivational energy will contribute as much to one's general plane of mental activity as the possession of $y$ units of ability; from the functional point of view this is equivalent to substituting one force for another to do the same work. Admiring the works and intelligence of some great personality is itself evidence of intelligence that is headed toward its own self-elevation. How else can one interpret the

sound observation that "genius" — or high creative ability that has been recognized by an audience — if seen only as a state of superhuman perfection is discouraging to the average person, but when seen as a product of growth, it becomes a powerful formative stimulus? One's ideals reflect one's existing intelligence and by a fruitful circularity also serve to raise its operating capacity.

"As for effects in the reverse direction, doubtless the level of intellectual ability influences motivation as well as is influenced by it. What goal is chosen, under what conditions a goal is changed, and what path will be chosen to attain it depend partly upon how the individual perceives the situation. The degree of difficulty in attaining his goals obviously affects his persistency." [1]

**Lewin's views on drive and mental attainment.** It does appear that an improvement in the motivation of a person may lead to an elevation of his IQ. Indeed, the changes reported in those studies dealing particularly with the dull or feeble-minded may be traceable to the drives aroused by the instructional practices adapted to their special requirements. The problem involved has been stated so clearly and simply by Lewin that we can do no better than to reproduce his language at this point:

> Behavior can be said to be dependent upon 'ability' and 'motivation.' To state this idea in somewhat less vague terms, one can say: what actually is done by the individual at a given time depends partly on the 'possibilities' inherent in the person and in the situation, partly on the forces (drives, goals) acting upon the person at the time. The concept of intelligence is definitely related to the 'ability' and not to the motivation; in other words, to the potentialities inherent in the person. . . . The purpose of intelligence testing is to measure the ability for intelligent action separated from motivational factors.
>
> The possibility of testing the intellectual ability of a person at a given time substantially independent of motivation does not, of course, mean that the growth of intelligence or even the momentary

[1] Kurt Lewin, p. 298 of the 39*th Yearbook* of the National Society for the Study of Education, Part I. Quotations used by permission of the Society.

actual intellectual ability of a person (which may be defined as the best that he is able to do intellectually in his present state) is necessarily independent from motivation. The testing procedure emphasizes strongly the relation between intelligent behavior and motivational situation by requesting something approaching an optimal state of the subject during testing; the subject should be comfortable emotionally and should readily accept the goals required in the different tasks of the test.

Two problems might be distinguished in the relation between motivation and intelligence: first, the motivational situation might change the intellectual ability of the individual in this situation but not permanently; second, the motivational situation might change the intellectual ability of a person permanently either by a sudden, strong influence or by the existence of certain motivational situations during a long period, which might gradually hamper or speed up the development of the ability of the person.

The level of intelligent behavior that a person exhibits can experimentally be demonstrated to be a function of the drives simultaneously activated in the situation and of the degree to which these drives operate unencumbered or under some load of frustration. For example: Two of Lewin's pupils observed for 30 minutes the free play of children with MA's from 2 to 6. The constructiveness of this play as judged by the spectators correlated about 0.80 with the CA and MA of the performers. Later these youngsters were brought back to the same situation containing the same toys, with this difference: more attractive toys were now visible at one end of the play space. Each child was allowed to play briefly with these alluring objects, but then had to return to the less attractive playthings. Once more the constructiveness of the play was rated over a half-hour period. Significantly, the average decrease in constructiveness when compared with the original situation was equivalent to a mental regression of about one and a half years, a sizable drop at this time of life. The decrement, both absolute and relative, was greater for the older children; *i.e.*, a child with MA 6 played in the frustration situation like a child of MA 4 in the original setup, but an MA 4 did not revert to less than MA 3 in the second arrangement. Through careful classi-

fication and rating of the symptoms of frustration it appeared that weak frustration led to but a small decline in constructiveness, while stronger thwarting produced a more serious drop.

This research reports cases where the intellectual aspect of behavior declines under inadequate motivational conditions. Inverting the small boy's adage that "whatever goes up, comes down," we may say that whatever can go down, can go up too, if the dynamic forces involved have been correctly analyzed. The two-way character of this relationship is thus expressed by Lewin:

> . . . On theoretical grounds, it is to be expected that the degree of differentiation of a person at a given time is not independent of the pressure brought to bear upon him: if this pressure is above a certain level, only those personal systems will remain relatively independent that are separated by rather strong dynamical walls. In other words, the differentiation of a child who is exposed to too great forces or is in a state of overtension becomes equivalent to that of a younger child; he will regress to a more primitive level.
>
> On the other hand, a person will bring his total abilities into play and therefore reach his highest level of constructiveness only if he gets involved in the activity with his total personality, with the totalities of his systems. This seems to be the reason why weak frustration or a certain amount of difficulty leads frequently to better work: it is more likely that under this condition the total personality becomes involved. However, if the forces acting on the person go much above this level of intensity, the constructiveness will decrease as a result of the dedifferentiation or 'primitivation' (if one may invent a term) of the person.[1]

**A condensed version of the issue.** As we shall try to show in the next chapter, the problem of the motivation of human conduct is essentially the same as the issue of causal determination in psychology as a whole. Intelligent behavior, like *all* behavior, is motivated, *i.e.*, it is an effect caused by the joint operation of many antecedent or coincident influences. The *pure* hereditarian version of the IQ is, we are convinced, untenable; but despite the favor with which we have

[1] *39th Yearbook* of the National Society for the Study of Education, Part I, p. 301.

viewed the environmentalist hypothesis, it must not be supposed that *all* of an organism's intelligence level is to be attributed to socio-educational forces, or that the research advocates of changeability so believe. We have been at great pains to demonstrate that these outer field forces act to push the IQ up or down, depending upon their quality, intensity, etc., but our genuine preference throughout has been for an interactionist theory of this and other organismic properties since obviously there must always exist a prior *something* to be raised or lowered. The most stimulating of environments will never create, much less raise, the "intelligence" of a stone because the possibility of developing this function does not exist in a rock, but is confined to the organized substance we call protoplasm. Underlying every manifestation of intelligence is a set of possibilities for achieving value experiences and like other human resources they may either be conserved and fostered or dissipated and depressed by neglect and ill use. Nature does set limits to all growth, but these confines are not as rigid and immovable as the nativists in psychology would have us believe.

It is possible that the popular interest in euthenics has resulted from a knowledge of the failure of programs for human betterment through the utilization of eugenical, biological measures: the 'best people' are not having the largest number of children (but the smallest), and human mating is proceeding in complete ignorance of the gene components of the parties involved. When we speak of good *breeding* in horses, however, we do mean just that sort of control: the close inbreeding of selected strains over many generations, with preservation of the fit and a ruthless destruction of the unfit, in terms primarily of physical traits. When we speak of *good breeding* among human beings, we refer really to *good rearing*; the kind of breeding necessary to establish and maintain pure-bred human stock would be considered incestuous.

In any case, democracy is upsetting to genealogy. What can one say about a socio-biological system that, upon a basis of $n$ generations of individual obscurity, produces in $n + 1$ or $n + 2$ generations notable reserves of human talent, leading to the highest achievement along scientific, artistic, and social lines? Certainly, if a political

system (democracy) can unleash such forces in a population biologically mongrel in type (the human race), our efforts may center less in the putative quality of human materials and more in the opportunities presented for stimulation and development. The great social problem of the world today is not shortage of talent, but wastage of talent.[1]

## SUMMARY

In this chapter, we have sought to deal with one of the most basic questions of mental improvement, namely, the real possibilities of raising a person's intelligence level. After examining the biosocial nature of intelligence as a function and considering the method used for measuring its amount, the *a priori* possibilities of increasing it appeared much greater than the "fixity" or "constancy" hypotheses allowed. A review of a selected group of relevant researches pointed more or less clearly to the conclusion that the IQ of the human organism can be made to rise and fall to a perceptible degree with the differences in the character of the environments in which it carries on its activities. The term "environment" was refined by making it equivalent in this context to the presence of those stimuli or energies which affect the quality of the insightful processes of the learner. These are enriched by a good environment and starved by a poor one. The work of the school and of education generally requires the establishment of such favorable environments for all individuals. Of course, the demonstrated effects of any environment fall far short of accounting for *all* of the individual differences in various population groups as we find them today. The educator and reformer will use eugenics where they can, but euthenics seems to be a more open road to human betterment at present. The interactionist theory of the IQ was advanced as most in harmony with the observed facts of conduct and as furnishing the best guidance for practical control of the improvement process. According to this position, mental ability — or one's actual Binet or equivalent score — is established and maintained

[1] George D. Stoddard, in the Introduction to *39th Yearbook* of the National Society for the Study of Education, Part I, p. 7. Quoted by permission of the Society.

somewhat as is suggested by the rough schema shown in Figure 20. A suprathreshold change in any one of these "arrows" means a change in the IQ plane. Human intelligence is a product of certain conditions — some of these can be regulated by the schoolroom, some by the home, some by the political and economic structure of the nation and community, and some by the individual himself after he reaches an appropriate stage of maturity.

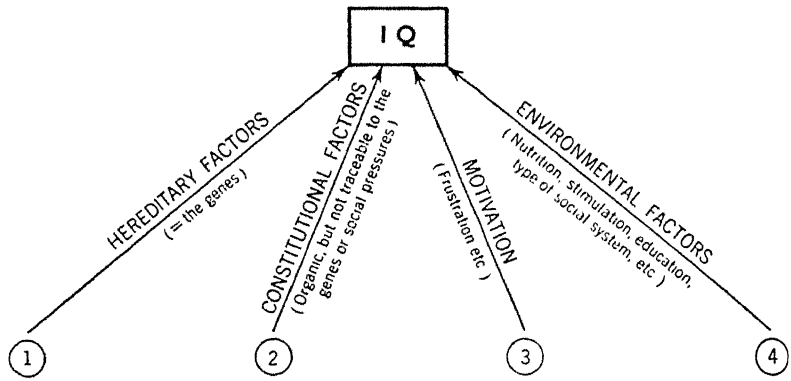



FIGURE 20

PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Do you agree that all teaching is a kind of individual and social reform? Are educators generally aware of their function as "formers" and reformers?
2. What unfavorable personality by-products, if any, result from a prolonged and steady concern with self-improvement?
3. How do you explain the high value which intelligence as a biological trait appears to have in our culture? Some social critics maintain that it is overvalued at the expense of other survival factors, but one could make a case for the view that it is still undervalued. State the evidence for both positions.
4. One recent definition of intelligence reads as follows: "Intelligence is the ability to undertake activities that are characterized by (1) difficulty, (2) complexity, (3) abstractness, (4) economy, (5) adaptiveness to a goal, (6) social value, and (7) the emergence of originals, under conditions that demand a concentration of energy and a resistance to emotional forces" (Stoddard). Is

this sufficiently comprehensive to do justice to all aspects of the concept as you now understand it? What, if anything, would you add? If you have a favorite definition of your own, compare it with that of your neighbor(s).

5. Is the relativistic spirit of modern thought congenial to the notion of fixed and invariable quantities and qualities of any kind? Submit illustrations from various areas of science.
6. Name some sample facts in the new field of ecology which bear upon the nature-nurture problem.
7. What is meant by "cultivated stupidity"? Is there such a condition? What is it that makes "acquired incompetence" possible?
8. Suppose you were entrusted for a full year with complete control over three groups of boys, all aged 7, and representing inferior, average, and superior test intelligence. What steps would you take if you were directed to do whatever could be done to raise the IQ of each?
9. Can an "interactionist" psychology, *i.e.*, one which stresses the energy exchanges between the organism and its environment, be strictly hereditarian or nativistic in its interpretation of personality attributes? Can it be wholly environmentalist?
10. If strengthening a person's drive to achieve leads to the same level of performance as an actual gain in brightness, what further hints for effective teaching and learning can be derived from this functional relationship?
11. How would you meet the objection that all the IQ shifts described in this chapter do not necessarily involve any change in true "capacity," but may merely be cases of better (or poorer) use of some capacity which has remained unaltered throughout?

## Chapter 7

# THE IMPROVEMENT OF PURPOSIVE BEHAVIOR: THE TRANSFORMATION OF MOTIVES

It was once the fashion in certain "tough-minded" psychological circles to ridicule as nonexistent or meaningless the problem of purpose in human action. Many pseudoproblems to which these adjectives may rightly be applied have unquestionably arisen in the history of science, but the issues centering about the purposive behavior of men are distinctly not among them. Ultrabehaviorism used to declare that all an observer ever saw was "$\text{behavior}_1 \rightarrow \text{behavior}_2 \rightarrow \ldots \text{behavior}_n \rightarrow$," and that the introduction of purpose into the situation was utterly superfluous. This position was strengthened by the methodological prejudice which denied that the individual himself could ever be a source of truth or knowledge making his conduct more intelligible to others and by a further tendency to delimit psychological inquiries to short segments of time and space wherein the aspect of purpose was commonly minimized and obscured. Nonetheless, even under those circumstances the same "purpose" which was thrown out of the window with great finality on some occasions was admitted back through the door in a different and more acceptable guise. Terminological preferences play a large part in the scientific comedy; [1]

[1] There is a saying to the effect that in England one can say anything provided one doesn't do it, but that in the United States one can do anything provided it is inoffensively designated. Hence the frequent search for euphemisms and the weight attached to the "right" names and titles. Social attitudes, as we shall see later, are seriously affected by labels of condemnation or laudation, a fact which creates an educational problem of the first order. The terminological quarrels of educators, psychologists, and other folks often rest on no higher base than this and provide another illustration of the necessity for universal "psychologizing" from which no individual or group can plead immunity.

for ourselves we must record the conviction that in one form or another, the notion of purpose is absolutely indispensable to educational psychology — without it the subject is in even worse a state than *Hamlet* without the Prince of Denmark.

## THE NATURE OF A PURPOSE

Wherever behavior refers to some past or future condition, it is all but certain that a purpose is involved. Conduct that is caught in flight by the investigator reveals a "stream" of behavior that has come from somewhere and is going somewhere. Action "flows"; whenever its movement is, or seems to be, determined in some measure by forces within the organism of which it is aware, we may say that what happens is "intended" by the person, *i.e.*, foreseen, approved, and brought into being by him. This does not mean that action is steered and guided without regard to the numerous specific and incidental stimuli which impinge upon the system. Such an adjustment is humanly impossible. But what apparently happens is that these smaller events are reacted to, and assimilated within, the larger pattern of aims which animate the person.

Consider the behavior of a child writing a letter. A lay rather than an expert or technical analysis may often bring us closer to the heart of the situation; at any rate, one should not be afraid to trust simple direct perception, or "common sense" at its best.[1] If we watch the child in the middle of his letter, we see nothing more than an exercise in penmanship marked by an occasional pause with random limb movements and facial expressions indicating reflection or by a request addressed to a nearby adult for the spelling of a word. The latter is symptomatic of a subpurpose, *i.e.*, the youngster wishes to spell correctly, partly because he is temporarily blocked in reducing to written form a sound with which he is acquainted orally, partly be-

[1] When "common sense" deceives us, it is usually because our perceptions have not penetrated through to the essentials of a problem as much as we had thought. Just as it is probably true that the cure for the ills of democracy is more democracy, so the corrective for those circumstances when common sense appears to mislead is more "common sense." The trouble with common sense, of course, is that it is so uncommon!

cause he wants his friend to whom the note is addressed to understand him, and partly because he is already sensitive to the social norm which usually tolerates just one sequence of letters as *the* way to spell a certain word. But if we saw only these subordinate purposes involved in the composition of a letter — the definite needs for pen, ink, paper, envelope, stamp, address, etc. — we should be missing the key to his behavior. The overall purpose cannot be completely executed without these smaller subsidiary purposes being accomplished, but genetically the larger purpose rests less upon them than they upon it, *i.e.*, the tensions affecting them would never have arisen had there not been some bigger purpose involved. What this more comprehensive goal is may frequently be inferred from the content of what is done, but if the child says, "I promised to write my teacher after I returned home from summer camp," this usually suffices to make clear to the observer the action that he is witnessing.

**"Wheels within wheels."** If, however, he wishes to pursue his inquiry further, he must trace back the present behavior to earlier biographical events. Every exhaustive description of a person's motives involves some reference to the historical background of his acts. A promise to write to one's cousin serves to establish some minor persisting tension in the promiser's system which is not wholly relieved or discharged until the promise is fulfilled. The degree of tension is conditioned by the awareness of the social code that promises are supposed to be kept; the amount of satisfaction that performance, or knowing that the pledge has been carried out, produces; and the interest the child has in being liked by the recipient who is pleased to receive the letter and by the parents who see in letter writing a gratifying sign of the kind of independence and maturity that they value. All of these specific "motives" may be postulated or each one may be directly known to be present in the situation. In any case, *no motive exists without some tension between the organism and its total field.* The simple observation with which we began has become sufficiently intricate for us to recognize a structure among the purposes of the sort shown in Figure 21. "Smaller" purposes are thus pre-

ceded, governed, referred to, and enringed by larger or more fundamental purposes to which they bear a part-whole relation. What we call basic "drives" or the common and dependable motives of mankind are usually to be sought in one of the outermost rings. Behavior consequently is not properly interpreted or understood until it has been placed in its broader context. Unfortunately, the full setting is not immediately visible behind every deed, a fact which makes the deciphering of human motives both difficult and fascinating.

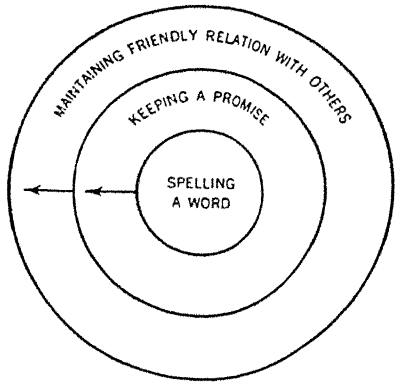



FIGURE 21

Note that a purpose does not exist without some psychic tension — it comes into being with some tension and lasts only so long as that tension endures. To many, the word "tension" suggests *high* tension, strain, and the literal sensorimotor discomfort accompanying the action of powerful and disagreeable forces. This, however, is but a special case that should not be allowed to color one's general use of the term. Every simple and unembarrassing question directed toward a person arouses *some* tension within him — without it the energy for producing an answer would not be released. These tensions, when pleasant, may be of a low order of intensity or rise to the level of a "thrilling" experience. Wherever there is tension in the organism, a purpose or motive is indicated; the converse is equally true. A tension is the physical substratum or equivalent of all purposive behavior.

Some tensions are quite temporary like those aroused by the reading of an exciting short story; others refer to objectives which are realizable only over a long period of years covering most of one's life as in the case of the high-school graduate who plans to become superintendent of the public schools in his home town.

## THE DEVELOPMENT OF ADULT GOALS OUT OF CHILDISH ONES

This view of the nature of purpose assimilates it to the gestalt conception of an "unclosed configuration." An "unclosed" structure is one which points to a whole or completed design, although not all of the indicated figure is present to the senses. Thus, a circle is



FIGURE 22

plainly implied in Figure 22, even though the ring has not been joined at the two open ends. The power of part of a situation (= a cue) to reinstate the total appears in all learned reactions and is one of the most fundamental features of all mental life; indeed, some psychologists have been disposed to consider it *the* criterion of mentality *par excellence*. Purposive activities at all levels bear many resemblances to this more general pattern of behavior as one may see (1) in the "intention" of a high-school sophomore to finish secondary school training, (2) the unwillingness of most students to drop a course once it has been begun, (3) the discomfort felt by a lecturer when time does not permit him to finish his exposition, and (4) the mild pleasure one experiences in correctly filling in such a sentence as "—— is the capital of Pennsylvania" and the irritation evoked by one's inability to round out "Thomas Jefferson died in the year ——."

The principle of "closure" or movement toward the natural or obvious end along lines of maximum simplicity implied in the per-

ceptual organization of most "open" situations suffices to make intelligible many acts already in the process of being performed, but it does not explain how these acts began in the first place. Once any performance is started, the completion tendencies impel the organism toward the implied goal as a result of the tensions that have been built up during the initial phases of the act. The riddle of motivation lies not in the last 90 per cent of an action sequence but in the very first stages. What are the primal energies that initiate any behavior series? This is the core of the motivation problem.

The search for a "first cause" is as difficult in psychology as in any other science where origins are important. An infinite regression in which one force lies back of another and so on interminably is far from satisfactory in any discipline, but it is a necessity that can be borne in psychology where the finite life span of the individual organism does not make the task too difficult. Genetically any purpose active at this moment represents either (1) a *continuation* of a purpose previously developed, or (2) a *specialization* and differentiation of some more general purpose that antedates it. Any large-scale objective may contain both aspects. A college girl who is preparing to teach the social studies in a junior high school has specified her vocational ambitions to a marked degree, the only details missing being those concerned with "where" and possibly "when"; but before a definite subject matter and level of instruction had been chosen, a vaguer set of purposes, such as (*a*) doing some sort of school teaching, (*b*) earning one's own living, and (*c*) being active rather than inactive, must have preceded in the rough order named. Retracing existing purposes back to the beginning serves to show their dependence upon the tissue needs of the organism and the cultural emphases operating within the person's environment.

**Our original goals.** Often, however, it is more convenient to begin with the "purposes" — if they can be called such — of the newborn organism and to watch them evolve as his capacities grow and as certain aspects of the culture become "interiorized" in him. The wants of the neonate are worth examining, for they are the germ that

expands into all the values that men later come to prize. During the first few months of life the baby's needs are few and simple. Crying is a sign of distress occurring typically when the child is

(1) hungry (or thirsty) and needs to be fed;
(2) tired and needs rest and sleep;
(3) physically uncomfortable owing to:
  (*a*) excess heat or cold;
  (*b*) soiled clothing;
  (*c*) digestive upsets;
  (*d*) muscular strain and postural maladjustments;
  (*e*) surface wounds of the flesh;
  (*f*) bacterial disease infections, etc.

The characteristic "helplessness" of the human infant resides in his inability to achieve the simple implied aims of avoiding bodily injury and maintaining minimal conditions for self-survival. Without the help of those who can manipulate the environment better than he can, the young child is doomed to perish because his needs are so much greater than his capacities.

The normal baby has other needs than those just mentioned. Before he is many weeks old, he refuses to spend all his time sleeping and eating. The expanding margin of his time devoted to other functions than these elemental ones consists in what is loosely called "play," but which is really a means for getting acquainted with the world and his own body. The advance beyond the vegetative state depends upon the enlargement of this period of the day's schedule. Thumb sucking, despite its bad reputation among modern parents, does serve in part to familiarize the infant with the properties of his organism.[1] The true social smile, usually first evoked by the smiles and sounds of others, is a reaction to the need for stimulation from

[1] A humorless and literalistic application of Freudian doctrine has intensified to heroic proportions the struggle of some mothers against the "evil" of thumb sucking. Actually some indulgence in it is normal for all children before they walk and talk. The real objections to it rest upon sanitary and quasiesthetic grounds. The act serves to discharge some mild tensions which adults take care of by smoking, gum chewing, or related mouth activities.

those of its own species. Something like a " variety drive " also seems to exist, for the child can often be quieted by being carried about the house and out of doors where other than " routine " objects can be perceived. The daily bath is usually appreciated not because the need for cleanliness is very marked, but because the little accompanying activities and the splashing represent an " interesting " variant in an otherwise repetitive existence. The minor exercises which the infant gives himself by vigorous leg thrusting suggest that free movement as such is a source of genuine satisfaction.

**Common aims of mature persons.** Out of this astonishingly narrow matrix of early needs and wants develops every later purpose that animates the adult. Instead of being contented with a half-hour's tour of the neighborhood on father's shoulder, the child eventually demands far more stimulation than this provides. Between this stage of environmental exploration and some adults' passion for travel there is an unbroken continuity. The experimental babbling of a well-rested infant and the dinner-table conversation of polite society are not as far apart as participants in the latter activity like to believe.

Because all human organisms resemble each other very closely and because the developmental circumstances surrounding them often have much in common, it is small wonder that many of their most general goals are alike. Many efforts to itemize these " similar purposes " have been made by psychologists since lists of instincts were first drawn up in the last quarter of the nineteenth century. These urges have been variously classified and many skeptical critics believe that any attempt to list them is doomed to failure in advance because of an inability to demonstrate their origin in either the genes or in the training we have received. While it would be desirable to make such a distinction with assurance in the case of each want, the practical value of such a list of " dependable motives " is genuine without this. A recent and useful list of the goals more or less uniformly sought by all men everywhere has been prepared by Thorndike: [1]

[1] *Human Nature and the Social Order*, 1940, pp. 117–118. Quoted by permission of The Macmillan Company, publishers.

DESIRES

1. bright colors and glitter; sunshine; soft, tinkling, and rhythmical sounds; sweet, fruity, and nutty tastes; touching what is soft and smooth and dry.
2. free bodily movement; rapid motion through space.
3. healthy normal action of the digestive, circulation, excretory, nervous, and other physiological systems.
4. having something behind one's back when resting; "being in a sheltered nook, open on only one side," as James says.
5. the presence of friendly, or at least not inimical, human beings.
6. "concerted action as one of an organized crowd."
7. to move when refreshed, especially as in running, jumping, climbing, pulling, and wrestling.
8. to rest when tired.
9. vocalization; visual exploration; manipulation.
10. mental control; to do something and have something happen as the consequence is, other things being equal, satisfying, whatever be done and whatever be the consequent happening.
11. witnessing the happy behavior of other human beings, especially of children.
12. successful courtship and love between the sexes.
13. voluptuous sensation, however obtained.
14. to manifest affection.
15. to receive affection.
16. intimate approval, as by smiles, pats, admission to companionship and the like from one to whom he has the inner response of submissiveness; humble approval, as by admiring glances, from anybody.
17. domination, being submitted to by others.
18. to surpass others in the work or play to which original nature leads us and them.
19. submission to a person toward whom it is the "natural" response.
20. In general, when any instinctive series is started and operates successfully, its activities are satisfying and the situations which they produce are satisfying, other things being equal.

AVERSIONS

1. the sight of black; sudden loud sounds; bitter tastes; the odors of putrid flesh; excrement and vomit; sensory pains; over-tension of muscles; impeded or insufficient action of the bodily organs.

2. slimy, wriggling, and creeping things on one's flesh.
3. large animals or objects like animals approaching one rapidly; angry scowling faces; solitude; darkness; being suddenly clutched.
4. pain.
5. severe shock of any sort.
6. being interfered with in any bodily movements which the individual is impelled by his own constitution to make.
7. the intrusion of strangers into the neighborhood of one's habitation and the abstraction of any object therefrom.
8. the seizure by others of an object which one is using.
9. being shut up completely within a small, and especially a strange, enclosure.
10. being subdued by a person to whom (or a thing to which) one does not naturally have a submissive attitude.
11. inattention or neglect by human beings whose attention one solicits.
12. the withdrawal of approving intercourse by masters.
13. looks of scorn or derision from anyone.
14. seeing others approved.
15. being outdone by others.
16. In general, when any instinctive behavior-series is started, any failure of it to operate successfully is annoying.

The principal difficulty with a list of likes and dislikes purporting to be shared by all members of the human race is not that it is factually incorrect in any particular, but that it appears too much as a set of "absolutes" without due regard to the modification of each impulse brought about by varying personal contexts. Thus, Number 3 in the list of aversions reads, "large animals . . . approaching one rapidly"; but to the big game hunter well provided with a trusty rifle and plenty of ammunition this is just the situation for which he has been yearning! To include Number 14 ("seeing others approved") among the aversions seems a bit ungracious even to one aware of the frequency of jealousy responses, and it does not strictly fit such cases as a political partisan honestly and earnestly cheering the candidate whom he admires. These contextual difficulties are real and show plainly enough that with a certain distribution of forces a desire may

become an aversion, and *vice versa*. Ordinarily, it is true that these specific drives do characterize our behavior, but when they are encompassed by a more comprehensive or controlling purpose, they may change and even reverse their usual properties. "Creeping things on one's flesh" do generally arouse an aversion, but one entomologist known to the writer kept a small colony of fleas under a circular glass cemented to his forearm in order to study their feeding habits; here desires Numbers 9 and 10 overruled aversion Number 2. Most adult purposes represent not the smooth unimpeded action of a single need, but the balanced outcome of either re-enforcing or conflicting aims. Consequently, any searcher for the purpose behind a given bit of behavior should be prepared to discover a combination of several and not just one!

## THE REDIRECTION OF PUPIL PURPOSES

Since the educative process is inherently incapable of neutrality or indifference to the values held by those it affects, teaching is vitally concerned with the kinds of purposes it encounters in the pupil population. To (1) some of these purposes it gives its approval and is satisfied with providing the organism with the requisite tools for realizing them; (2) others it finds unworthy and seeks to eliminate them utterly, for purposes like anything else that is "real" can be made to vanish by changing the conditions upon which they depend; and (3) still others are viewed as promising possibilities, which, while not satisfactory in their present form, may be made such by appropriate reshaping and effective channelizing of the energies resident in them.

Concretely, (1) a child's desire to learn more about the boyhood life of George Washington is deemed commendable in any American school system and accordingly such learning aids as books, articles, pictures, records of the folkways in Colonial Virginia between 1732 and 1750, and other "documentary" aids are provided so far as the educational plant can make them available; in addition, the learner is encouraged to express himself about the youthful Washington by

writing, acting, or making something pertaining to his "hero." If, however, (2) the lad should seriously express an ambition to be a gangster and to court adventure by murder and robbery, the school can do no other than to labor with might and main to uproot such a perverted aim. How this is to be done depends upon an exact knowledge of the origin of this repugnant objective, the positive "assets" of the youngster's personality, and the pedagogical skill employed in extinguishing this purpose. Generally, some other more acceptable goals must be put in its place as this helps the less satisfactory one wither away. The third type of purposive problem appears in (3) the common case of the adolescent girl who is deeply impressed by motion-picture actresses and who models many of her acts and attitudes upon their appearance and behavior as portrayed in the films. Outright condemnation of such imitation encounters too severe resistances and does not rest upon a sound appraisal of the impulses at work. The longing to be a Hollywood star cannot be modified by scoffing alone. Instead, the well-prepared teacher helps the child to distinguish between the entertainment attractions of a neat, clean, pretty, and "glamorous" personality — to which there can be no legitimate objection — and the merits of solid but unspectacular achievements resulting from the mastery of skills serviceable in daily life; but better than such preachments are the provision of opportunity for acting in simple school plays and casting the girl in such dramatic roles as will capitalize upon this enthusiasm, furthering her insight into her own motives, and developing her appreciation of virtues that lie deeper than the histrionic.[1]

**Source of standards.** To deal with purposes in this way requires the assistance of some master criteria. No one dare sit in judgment upon another's aims unless he can refer them to goals that experience indicates are superior in terms of personal satisfaction. The norms

[1] The "therapeutic stage" first used by Moreno with neurotic and psychotic patients is rich in valuable hints for utilizing school dramatics as a guidance institution. — All school subjects and activities have potentially specific therapeutic value for certain pupils.

usually appealed to when a teacher faces an "opponent" in the person of an "independent" pupil are frequently lacking in power to convince and to guide conduct because they too often are really no more than a set of whimsical prejudices. Most psychologists have shied away from any attempt to specify what the criteria of a psychologically sound set of purposes might be for fear that their own lists of standards would be viewed as amateur efforts at moralizing everyday experience. Yet educational psychology is sadly defective if it cannot do something to meet this requirement of all instruction. One highly interesting bill of specifications of a good life for man has been proposed by Thorndike [1] on the assumption that he were a responsible scientific trustee for human welfare — which every teacher to some extent undoubtedly is!

### Desirable Provisions to Be Made for Man

1. Maintenance of the inner causes of the joy of living at or above their present average.
2. Food when hungry, and drink when thirsty.
3. A diet that is physiologically adequate.
4. Protection against pain-causing animals.
5. Protection against disease-causing organisms, poisons, and other causes of disease.
6. Protection or insurance against accidents and disasters, such as floods, earthquakes, wars, for which the person in question is not responsible.
7. Protection against extreme shocks, fear, and strains.
8. Some room or place where he can rest undisturbed, protected from the elements and from bad or uncongenial men.
9. Enjoyable bodily activity, especially when young.
10. Enjoyable mental activity, including aesthetic pleasures.
11. Opportunity for human society.
12. Opportunity for courtship, love, and life with one's mate.
13. Opportunity to care for children and to be kind to human beings and animals.

[1] Pages 405–406 of *Human Nature and the Social Order*, 1940. Quoted by permission of The Macmillan Company, publishers.

14. The approval of one's community, or at least the absence of scorn or contempt.
15. The approval of one's self, self-respect, the absence of shame and remorse.
16. Opportunity to have friends and affection, if deserving of them.
17. Opportunity to be a friend and give affection.
18. *a.* Opportunity to exercise power over some persons, animals, things, or ideas, making them do one's will.
18. *b.* Opportunity to serve a worthy master.
19. Membership in organized groups, and the right to participate in activities and ceremonies which are (or at least are thought to be) important.
20. Opportunity to compete with one's peers, winning in about 50 per cent of the trials.
21. Opportunity to compete with one's own past record, and, if deserving, to have the pleasures of achievement and success.
22. Occasional opportunities for adventure, risk, and danger.
23. Something to be angry at and attack.
24. Protection by society (via customs, laws, and government) in what is regarded by the existing moral code as a good life.
25. Freedom to discover and publish verifiable truth.
26. Enjoyment of the happiness of others.

These items are probably not the only wants that educators must consider in their daily work and there is no reason why this tentative but useful list should not be corrected and amplified by every teacher in the light of his own professional experience. They do give to each school worker a set of directives which, by definition, serve to prevent the aimlessness of instruction carried on without them. Their great technical advantage is that they are not arbitrary, but are the natural imperatives arising out of the organism's constitution and the lessons drawn from repeated interaction with the human and physical environments. Anyone whose likes and dislikes run seriously counter to these "enlightened" purposes is risking ultimate defeat, because the nature of Nature, the nature of others, and the nature of his own

system sustain and encourage some objectives and eventually suppress others that are maladaptive.

This defense of the spirit of the Thorndikian specifications of the wants that education — and other "philanthropic" institutions that are literally and authentically such — should implant and, once implanted, struggle to fulfill, does not mean that important corrections cannot be made in many of the suggested components. Thus in item 16, the proviso "if deserving of them" seems like an uncharitable addition, for even the worst of men probably ought not be denied friends and affection, unless it is intended to make him even worse than he is. Item 20 gives support to a limited type of competition, but one can make a good case for the complete extermination of every vestige of the competitive impulse no matter how it may manifest itself. The concession to anger that appears in Number 23 may be defended; it is perhaps better that men should be angry than that they be afraid (if that is the alternative); but it implies that we need something to hate without introducing the proper reservations concerning the legitimate objects of this emotion. Hate is an unlovely sentiment even where it is of the "righteous" variety, and its eventual abolition can hardly be deemed undesirable. In Number 25, the restriction of truth to the verifiable variety seems dangerous in the extreme, for it implies the disallowance of all "wild and fantastic" speculation. The critical reader should have little difficulty in making similar remarks about most of these items.

**Universal social ends.** Another way of dealing with the question of educationally valuable purposes is to dichotomize behavior into that which moves *away* from conditions hurtful to the species and that which moves *toward* those that further its development. This is the ancient problem of Good and Evil in more modern guise; and the school must continue to aid each new generation to eschew the one and to seek the other. The good and the bad have a curious reciprocal relation in thought, *i.e.*, as attributes of phenomena to which human judgments of worth are attached they act like any

other set of "opposites," such as high-low, wet-dry, fast-slow, etc. We see this clearly in a famous list of the "Kingdom of Evils" prepared by a distinguished psychiatrist of a generation ago:

A

1. Ignorance.
2. Disease.
3. War.
4. Poverty.
5. Vice and Crime.

Each of these large abstractions suggests some human affliction to be prevented, and cured, and extirpated by the introduction in their respective places of such verbal and factual "contraries" as

B

1. Knowledge and Understanding.
2. Health.
3. Peace.
4. Abundance.
5. Virtue and Integrity.

Obviously it is the implied goal of *all* human effort as expressed through other institutions than education to reduce the experiences grouped under A and to increase those grouped under B. Education and the numerous arts and sciences commonly subsumed under it are specifically entrusted under our social division of labor to deal with Number 1, but they cannot do this effectively without touching in some measure upon the other four values. Similarly, organized national governments are the major instruments for dealing with Number 3, but any attempt to further $B3$ requires some attention to all the others in the series. The interdependence of our objectives is one more illustration of the organic relatedness that is inescapable wherever living creatures are involved. Every person's mind, for example, is a "federation of purposes" tending not toward a single goal but toward many connected ones. This is true regardless of age.

The chief difficulty with such a statement of common human values as those listed above is not their lack of exhaustiveness — since some important goods and ills are missing from it — but their excessive generality. They outline but roughly and approximately the ends that men rightly desire and permit a vast amount of conflicting opinion as to the means of reaching them. Moreover, the gap between the general and particular is often very wide, notably in the case of one eminent president of the United States who is said to have loved mankind in the abstract but to have hated the representatives of this species in the concrete! This is one of the serious pitfalls that beset contemporary educational practice because of the unavoidable breadth of the terms in which its objectives are couched. Ignorance is the outstanding evil against which pedagogues struggle, but the appalling ignorance of these same pedagogues on certain crucial matters is not only denied by them, but many direct efforts to correct it are vigorously resisted. One of the saddest research findings ever made by the present writer was the discovery that more than half of the elementary-school teachers of the nation did not believe the principle of organic evolution, the rock upon which all the sciences of life, mind, and society now stand.[1] A situation like this defines one of the most serious obstacles in the way of developing "enlightened" purposes in school children. Some purposes, if not all, depend upon the possession of a body of information respecting the objective itself; thus, no country girl could wish to attend a normal school if she were not previously aware that such an institution existed. Purposes, in turn, shape the kind of information one accumulates, e.g., it is improbable that any student would learn of his own accord that Guatemala is a southern neighbor of Mexico unless a prior intention to increase his stock of geographical information were operative. This circular relation between purpose and knowledge is characteristic of most mental functions and is a special case of the more universal rule that one activity gives rise to another activity.

[1] See G. W. Hartmann, Social Attitudes and Information of American Elementary School Teachers, *Journal of Educational Sociology*, 1938, 11, 506–510.

## FUNCTIONAL AUTONOMY

The possibility of improving the quality of human purposes ultimately rests upon a natural phenomenon which Gordon Allport has recently labeled "functional autonomy" and which Woodworth much earlier called the transformation of a "mechanism" into a "drive." This conception is built upon the observation that in our behavior those activities, conditions, and objects which once served as means to an end may become ends in themselves. At the beginning of this chapter we outlined the theory that each motive has its local origin in the organic tensions found in the body of the neonate. This is identical with the proposition that all adult purposes can be traced back to their predecessors in babyhood. The reality of this historical link cannot be successfully disputed. But motives, like the children in which they occur, do not remain the same — they change with successive acts. Motive *A* leads to Act *B*, which, if continued long enough, enables Act *B* to generate its own "steam" so that it serves as a motive independently and directly for Act *C* without calling upon any energy latent in Motive *A*. This series may be expanded so that by the time Act *N* is reached, Motive *A* is no longer functioning in the immediate situation; Act *N* is then said to be done "for its own sake," *i.e.*, to contain its own motive intrinsically without reference to anything external or antecedent thereto.

Workmanship is a favorite example among educational and industrial psychologists of the reality to which functional autonomy refers. A superior teacher is impelled to do his job well long after the tenure, the pay, and the approbation of others which initially may have urged him toward excellence in his profession have lost their power as incentives. Habitual purposes have now been created; what once was a "mere" instrumental technique now becomes a master motive, even though depression years bring salary reductions, economic insecurity, and other frustrations. To quote Allport who has made this idea central to his entire theory of personality: [1]

[1] G. W. Allport, *Personality, A Psychological Interpretation*, New York, Henry Holt & Company, 1937, p. 201.

Psychometric studies have shown that the relation between ability and interest is always positive, often markedly so. A person likes to do what he can do well. Over and over again it has been demonstrated that the skill learned for some external reason, turns into an interest, and is self-propelling, even though the original reason for pursuing it has been lost. A student who at first undertakes a field of study in college because it is prescribed, because it pleases his parents, or because it comes at a convenient hour, often ends by finding himself absorbed, perhaps for life, in the subject itself. He is not happy without it. The original motives are entirely lost. What was a means to an end has become an end in itself.

And there is the case of genius. A skill takes possession of the man. No primitive motivation is needed to account for his persistent, absorbed activity. It just *is* the alpha and omega of life to him. It is impossible to think of Pasteur's concern for health, food, sleep or family, as the root of his devotion to his work. For long periods of time he was oblivious of them all, losing himself in the white heat of research for which he had been trained and in which he had *acquired* a compelling and absorbing interest.

A much more modest instance is the finding of industrial research that when special incentives are offered and work speeded up as a consequence, and then these special incentives removed, *the work continues at the speeded rate.* The habit of working at a faster tempo persists without external support.

**Original and derived drives.** The reality of transformed motives is what makes possible the appearance of civilized or "cultivated" impulses on the base first provided by cruder, *i.e.*, less differentiated, purposes like the ancient twin forces of hunger and sex. Pupils must eat, yes; but no teacher tries to encourage learning by dangling a piece of buttered bread before the eyes of a half-starved class and making the mastery of the multiplication table a prerequisite to feeding. Not that a certain effective control over conduct is not thereby exercised; far from it, for until very recently in human history, group behavior was largely regulated by methods as raw and primitive as this. But suppose the child is constantly well fed, as he ought to be — what then? Other impulses must be aroused. The learner's purposes do not remain stationary but increase with his experiences. The normal school child of 10 has no earthly reason for being con-

cerned to know anything about Demosthenes, but by the time he is 16 or 18 his interest in public speaking or in Greek history or in the general personality problem of "achievement under handicaps" (all emerging in the interval) may have fired him with an enthusiasm for this classic orator. His purposes have changed because he has changed; significantly enough, these new purposes serve to change him further. A fuller discussion of this elaboration of interests must be postponed to later chapters.

All purposive behavior as described above is closely associated with voluntary action; indeed the two are hardly distinguishable. Popular discussion makes much of methods of increasing one's will power, by which is meant the intensification of one's drive toward a particular goal or toward all goals, in which the generalized form of response known as a personality *trait* appears. He who has customarily reached his objectives because they have been properly graded to his maturation level usually suffers no deficiency in what is termed "will"; such behavior commonly arises when persons have been repeatedly confronted with tasks beyond their present powers with a resulting enfeeblement of all urge to accomplish anything because of the probability of defeat. When the total resources of the organism are thrown into an act, he is said to *will* its performance. There is no will as a separate mental function which makes things happen any more than there is *an* intelligence in the brain which solves problems for us. There is a quality of persistence which a person exhibits by refusing to be blocked in his goal pursuits. If this characteristic is displayed with ends deemed undesirable, we call it "stubbornness," but if it appears in connection with approved aims, it is more flatteringly spoken of as evidence of an "indomitable" courage. Attachment to *my* standard is dubbed "loyalty," attachment to *your* cause is "fanaticism." There is no end to the number of these paired "opposites" that are really "similars" save for the judgment of worth that is added. In any event, there is no reason to praise a strong will indiscriminately, for many past and present tyrants reveal this trait to perfection. The education of the will requires some-

times the earnest pursuit of an objective *where that is the appropriate response*, sometimes the cessation of an unpromising enterprise, and sometimes a refusal to embark on any at all. To repeat: The will is the entire conscious organism governing the behavior of one of its parts or steering the whole system toward some goal. Psychologically, it is a shorthand way of describing motor co-ordination or the systemic energies released in the attainment of some value.

## THE TOPOLOGICAL METHOD OF PORTRAYING PURPOSIVE BEHAVIOR

There is a vast literature devoted to the subject of this chapter which makes use of such allied conceptual "constructs" as desire, wish, tension, valence, vector, want, need, appetite, aversion, motive, urge, impulse, demand, etc. Most of these terms have already been employed more or less synonymously. Two of them, however, are probably comparative strangers to the reader, *viz.*, *valence* and *vector*. To explain their specific usage it will first be necessary to state briefly again what is meant by the topological psychology which, like Freudism and the variant psychoanalytic systems and hormism, is a school or grand theory built around the notion that man is primarily a goal-seeking creature.

Topological psychology, to which the reader has already had some introduction in the second half of Chapter 5, is largely a creation of Kurt Lewin and his pupils. It takes its start from the application of the physical "field" concept to behavior made by the gestalt psychologists since 1912, and is an extension of this basic field notion to such problem areas as emotion, will, personality organization, overt action, etc. Stated too simply and somewhat artificially, this view argues that all behavior is best interpreted as an amplification of the basic schema shown in Figure 23. The X, or thing to be studied and explained, is always present in some "field" and it can be understood and controlled only by reference to the latter. If the structure or organization of the field changes, X also is changed, internally and externally; for example, X in Field *A* is different from X when embraced in Field *B*.

This is the most general way of defining the topological viewpoint which is a special instance of the theory that *all* events are field events, *i.e.*, events occurring within a finite field.

Topology, as the related name "topography" suggests, is the abstract science of space relations. Technically, it is a branch of mathe-

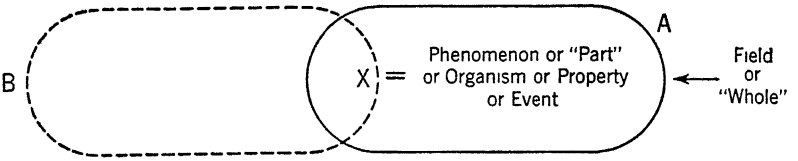



FIGURE 23

matics closely akin to geometry but even "purer" than this. Topology was brought into psychology as a means of enabling the psychologist to represent certain dynamic relations between persons and persons or persons and objects. For example, the social relation between an individual with great political, economic, and other power and a "humbler" personage is hard to quantify in the customary metrical sense by saying that one emits a million units of electromotive force and the other no more than a thousand. We do know that in the customary field in which these two are interacting the lines of force coming from the "great" man exceed those of the lesser. A simple approximation to the essentials of the situation may be made as is illustrated in Figure 24. This symbolism is crude, but

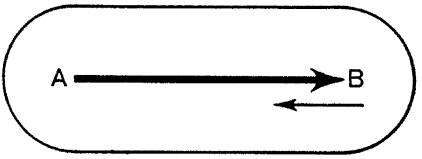



FIGURE 24

the long, heavy arrow depicts the exercise of a strong force and the short, light arrow the release of a comparatively weak force. Other more refined and accurate symbols have been added by an elaboration of this basic idea.

Topological representation of a behavior situation becomes more complicated as soon as it seeks to take account of the fact that certain phenomena in every organism's field attract it while others repel it. The psychological property of objects which the organism wants or toward which it is drawn is termed " positive valence " after the electrochemical analogy; objects that the organism dislikes are said to possess " negative valence." Every experienced field probably contains objects with these different kinds of valence. The attraction and repulsion produced in the individual by positive and negative valences, respectively, leads to the corresponding but derived notion of positive and negative vectors, used literally to represent energy magnitudes possessing the attribute of direction. Valences and the resulting vectors are the field forces outside the organism itself responsible for its behavior.

**Applications of the schema to " choice " situations.** The essential Lewinian symbolism may be illustrated by the case of a college senior who is offered a graduate school fellowship at a reputable university and also has an opportunity to begin teaching in his chosen field immediately. Both possibilities possess fairly equally balanced positive valences, although the vectors necessarily lead in different directions. The visual diagram (Figure 25) shows the structure of this

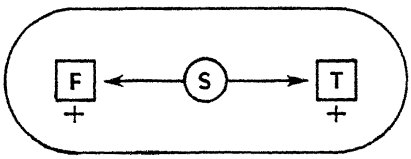



FIGURE 25

choice situation; $S$ is the senior, $F$ the fellowship, and $T$ the teaching post.

If both alternatives facing an individual are distasteful — such as leaving school or borrowing money to finish his studies — then the existence of the two negative valences and vectors appears in the form shown in Figure 26. $S$ is the student, $L$ the leaving alternative, and $B$ the borrowing alternative. Forces emanating from them act to push

the individual away from them unless still stronger forces from elsewhere overcome the vectors thus set up.

In the third type situation, one negative and one positive valence are assumed to operate upon the individual — the " push " of one force and the " pull " of the other combine to produce an unambiguous response. Thus, if a pupil is praised by his parents when his re-

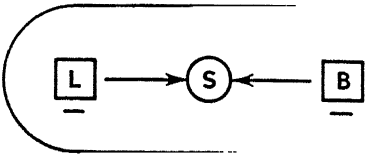



FIGURE 26

port card is good and scolded by them when it is unfavorable, the desire to have a satisfactory school record is greater than if either of these influences were operating alone.[1] We then have a situation as is illustrated in Figure 27.

Topologists use these " field drawings " in great profusion and have shown remarkable skill in applying them to a wide variety of personal and social situations. They reject the common view that these

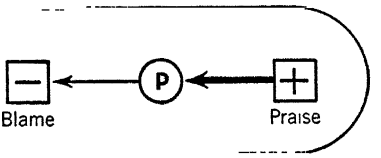



FIGURE 27

schemas are little more than useful pedagogical aids — incidental " blackboard sketches " as it were — and claim that if they are properly representative of the structural relations of the temporary field being analyzed, they make possible a certain measure of control over behavior by permitting trial changes " on paper " from which infer-

[1] This at least is the classic version. Recent experimental studies on the differential motivating effects of reward and punishment indicate that reward has much, but blame almost no, real power to fixate a certain type of associative learning. In complex social circumstances, however, the two forces act to supplement each other.

ences for action may be drawn. If the person's conduct is traceable to something in the field, then an intentional redistribution of the forces therein must result in changed conduct. The teacher can learn much by considering the responses of his pupils like the iron filings that trace different patterns depending upon the placement of the magnets in a limited surface area. If, for instance, 30 or 40 steel fragments are clustered in a given position by the proximity of a single magnet of a given "power," then the introduction of a second magnet serves to rearrange them along the new "lines of force" now present. Further changes in the inanimate pattern may be brought about by the intervention of new forces properly grouped.

It is plain that topological psychology is necessarily environmentalist in its approach to the grand problem of improving behavior. The organism is made better, *i.e.*, what it *is* and *does* are increased in value, by the reshaping of its setting. The principal weakness of this view is the apparent minimizing of the amount of "spontaneity" revealed by the individual. The field shapes the organism, but the organism (within more rigid limits, undoubtedly) also reshapes its own immediate field. Topologists grapple with this acknowledged difficulty by emphasizing the different internal structure of various personalities; behavior thereby becomes an interaction between an organized *outer* field considered as a total and an organized *inner* field similarly considered. Seen in this perspective the "purposes" an individual holds are not exclusively his own — they are also, in part at least, the purposes of the physicosocial field, strange as this mode of expression may appear on first sight.[1]

## SUMMARY

Much of the content of educational psychology is found in the cardinal fact that human beings gravitate toward certain states and away from others. This approaching and withdrawing behavior is

[1] No naturalist need fear that this implies a resurgence of the discredited cosmic animism known as transcendental teleology. What is here affirmed is simply the genuineness of an immanent teleology.

coeval with the life cycle of the organism and seems to represent some all-inclusive "aim" of the system to seek conditions that promote its functioning and to stay away from those that hamper its normal activities. The organism is clearly concerned with the welfare of its own body. This is no narrow objective when one reflects upon the many forces that injure our flesh, some of them of our own creation and attributable to a lack of harmony among our purposes or to ignorance of the methods of controlling these influences. But the objectives which begin there do not remain confined to their source — they grow and develop like other organic things. A purpose is essentially an unfinished act; and an individual's series of purposes, like himself, remains incomplete until the biological span has run its course. Formally, all behavior is an effort of the organism to restore the equilibrium that is constantly being upset by forces internal and external to itself. The new equilibrium achieved after the "disturbance" has been accommodated to is not identical with the old equilibrium. The search for "balance" in experience has led to educational endeavors to deal with the elaboration of this purposive behavior in the young by creating purposes which were previously nonexistent, by suppressing some, and by modifying and redirecting others. The desires and aversions commonly found in our culture are not permanently satisfactory and man consequently finds himself with a desire to change his desires, *i.e.*, a bigger purpose seeks to regulate smaller purposes. Teaching here, as in so many other cases, is largely a form of assistance provided to natural development since purposes are constantly waxing and waning. The purposes that children have make education itself possible, and it in turn molds the purposes it finds into later more adaptive ones by organizing into various patterns the field forces surrounding the learner.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. How are the concepts of tension, closure, and purpose connected in your thinking, *i.e.*, what interrelationships do you recognize between them?

2. Watch for about 20 minutes the spontaneous behavior of as young a baby in a wakened condition as you can find. Make a notation of every single thing it does in that interval. Did you learn anything about the infant organism that you did not know before? Why?
3. To what do you trace the difference between the goals you had at 5 and 10 years of age and the aims that characterize you at present?
4. Does any person ever act without some motive? Must this motive be applied externally before any behavior occurs?
5. What suggestions could you offer to a teacher who has difficulty in "motivating" a class of practically minded high-school boys in a sophomore course in English literature where "belles-lettres" constitute the chief reading material?
6. Is topological analysis an adequate means of describing the most complicated educational situation with which you are familiar? What are its defects as you see them?
7. Why are some persons more strongly impelled than others to work for the abolition of poverty? Try to secure light on this problem by case examinations of a few young people who are much concerned with this objective, of some who are indifferent, and of some who are even hostile to such a purpose. Are there any characteristic differences in the personality qualities and past histories of these three groups?

# Chapter 8

## THE IMPROVEMENT OF THE EMOTIONAL LIFE

The human being is a many-sided organism. His behavior is varied, not unfailingly simple. Different conditions evoke different reactions. This changeability is a source of both pleasure and distress to the subject and others affected by him. The first "social" smile of the little baby creates intense delight in his parents, but the cries of hunger, pain, or fatigue which may follow in a few moments have a mildly upsetting effect upon those who must listen. The coming and going of these states of "feeling" constitute much of the inner core of one's psychological life, and the qualities of excitement or depression involved may make all the difference between a happy and an unhappy existence. For good or ill, the education of the emotions is one of the great tasks the school encounters in its efforts to develop the young.

### WHAT IS AN EMOTION?

A person may be said to be emotionally aroused whenever he is in an excited condition. Fear and anger are typical emotions because they reveal so clearly the heightened energy that is produced whenever the organism is strongly affected by some experience. Any reaction in which the intensity factor is prominent usually strikes us as being emotionally toned. Emotion is that which characteristically distinguishes a polite "Good morning!" for acquaintances from a warm greeting of welcome for close friends or from the enthusiastic and passionate embrace of reunited lovers. An emotional situation is one which vigorously rather than feebly awakens our responses.

While the intensity factor is plainly basic to the existence of a true emotion, certain qualitative features enable one to differentiate between strong fear and strong anger. Even though the bodily transformations that accompany fear and anger are amazingly alike, introspectively they are easily differentiated. The external circumstances that evoked these states and the special overt forms in which the emotions are expressed also aid one in determining what kind of "upset" is involved.

In addition to these dramatic qualities of high intensity of energy, and the inner and outer patterning of each commonly segregated emotion, psychologists usually recognize the presence of a feeling-continuum. Feelings may be either pleasant or unpleasant; formerly it was customary to add a separate feeling of indifference, but it is probable that this is no more than a subthreshold area where liking and disliking are hard to discriminate. Conditions of very low positive pleasantness or low negative unpleasantness are difficult to tell apart and the term "indifference" is applied to this overlapping region of uncertainty.

Every emotion then has four component parts: An intensity factor, a qualitative aspect known to the subject, a physiognomic or expressive element detectible by an outside observer, and an agreeable or disagreeable feeling tone. The general term "affection" includes all these components. A full description of every affective state requires an analysis and specification of each of these four features.

## PERSONAL HAPPINESS AND THE EMOTIONS

From the point of view of individual improvement, the significance of the emotions lies in the decisive contribution they make to that general condition of the organism vaguely designated as "happiness." A happy person is the goal of all human striving — it is the implied end of the form of life embodied in our structures and functions. No teacher should be teaching who is not genuinely happier in that occupational activity than in any other; and the ultimate justification for sending children and adults to school is that the experi-

ences there provided increase the level of happiness eventually reached by them. Where this consequence is not forthcoming, mismanagement of the instruments or agencies for its attainment must be held responsible; the larger goal itself does not need to be abandoned or revised, for it remains as valid as ever.

It is astonishing how often laymen and educators lose sight of this unalterable first principle. Yet literally every phase of school life is subsidiary to it. The theme of "improvement" of personality which runs throughout most of this volume is unintelligible except on the assumption that gains in certain functions contribute to welfare. The intelligent person knows that his own happiness is not safe or permanent except as others are also able to be happy. Hence in seeking his own welfare he must simultaneously seek that of the rest of his fellows. This insight is so elementary that one must marvel at the incredible stupidity of many rich, powerful, and eminent personages who fail to act upon it, although their behavior in this respect does not differ noticeably from that of the vast majority who cannot be thus characterized.

The obstacles in the way of personal and group happiness are many, but primarily they consist in a lack of understanding of the conditions that make for this state. Happiness apparently is not something that can be produced directly; the best one can do is to establish the circumstances under which it may emerge. If people are not happy under a certain regime, *i.e.*, if their "morale" is low, this fact constitutes the severest single indictment of the institution affecting their lives. The psychiatrist Myerson has advocated a program of "eupathics" for elevating the mood of mankind as a necessary adjunct to eugenics and euthenics, and Powys rightly declares that, "We cannot claim that Nature puts her seal of approval upon our culture until we can prove that it results in greater happiness for the individual who practices it." [1]

[1] A. Myerson, Eupathics: A Program for Mental Hygiene, *Journal of Abnormal and Social Psychology*, 1918, 12; and J. C. Powys in the *Meaning of Culture*, New York, W. W. Norton & Company, Inc., 1929.

**Components of happiness.** In developing a specific " technology of happiness " it has long been recognized that the affective reactions of man are of crucial importance since one indispensable ingredient of the happy frame of mind is the fairly constant presence of a pleasant feeling tone. A person is unhappy when he is in a bad emotional state; and contrariwise he is in a condition of joy when forces favorable to the appearance of that emotion converge upon him. The factors that will create this common condition of happiness vary from one individual to the next, and for the same person at different times of his life; but we may derive a hint from the field method of presentation exemplified in Figure 28.

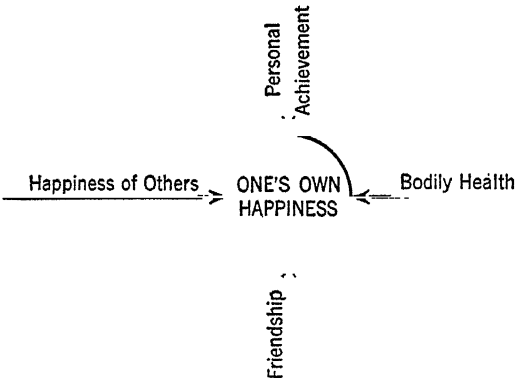



FIGURE 28

Obviously these four factors alone, even when fully favorable, do not exhaust the effective conditions of a sense of inner well-being, but they do suggest the kinds of forces which must be identified and manipulated if happiness is to ensue.

Long before educational psychologists appeared on the scene, wise men had recognized that happiness was largely a phenomenon of the inner life. What this means is that apparently beneficial external conditions do not suffice to maintain pleasantness unless certain requi-

site internal conditions are also co-operating to produce this result. Happiness undoubtedly is facilitated by some unknowns of constitution, temperament, a cheerful viewpoint, etc. But pleasantness, like every other psychological phenomenon, is a result of *interaction* between the organism and its environment. It is crude and wrong to identify happiness completely with the possession of worldly possessions, the deference of others, and similar goods; but it is equally erroneous to assume that these outer circumstances are of no potency whatsoever. Many a teacher has gained in happiness by simply changing his position from a depressing physical setting to one of greater esthetic appeal. Painting the walls of a schoolroom in an attractive color has not only brightened the externals of an educational situation, but actually given a "lift" to the temper of the group affected. Such stimuli are far from being *sufficient* for the production of high morale, but neither are they wholly irrelevant to its attainment.

In an autobiographical sketch by a past president of the American Psychological Association, the following significant passage appears:

I am desirous of participating in the solution of one more problem in applied psychology. That is the problem of protracted human happiness. Whether or not it fits in with one's philosophy of life, the fact is incontestable that happiness is an important if not the most important aim of human endeavor. Notwithstanding this fact, it has received no commensurate scientific attention. The theory of the happy life remains at about the level where Greek philosophers left it. There has been an immense amount of ameliorative activity and human welfare work, but it is practically all a treatment of symptoms without fundamental analysis. We are trying to correct a number of the supposed major conditions of unhappiness. Personnel studies try to avoid putting round pegs in square holes. Studies of family life, like that of Hamilton's, try to develop adaptive behavior in the smallest social group. Medicine and hygiene try to cure and prevent ailments of body and mind. But these symptomatic and ameliorative activities touch only small sections of human unhappiness.

Scientific information as to the fundamental positive conditions of protracted happiness are conspicuous for their absence. We do not even know the laws by which pleasant situations become unpleasant and unpleasant situations become bearable or even pleasant. The positive conditions of happiness are left largely to accident, such as the satisfaction of instinctive wants with its tragic disillusionments and negative adaptations, the economic pressure to provide a market for manufactured products, the exigencies of the labor market, the desire to amass wealth, or the abolition of private wealth. There are numerous wise protests that protracted happiness is achieved by none of these things; but positive scientific data on the real conditions are as inconspicuous as scientific interest in the problem. If there were a real solicitude for intelligent adaptation, our science would be busy with very different tasks.[1]

**Inductive analysis of student happiness.** In an effort to determine some of the conditions underlying variations in happiness, the writer studied a group of about 200 college sophomores pursuing a course in educational psychology. They had independently taken a variety of personality tests during several demonstration lessons, and were now asked to check privately the following blank with a graphic scale which is self-explanatory:

Self-Rating of .....
(Please insert your full name here)

DIRECTIONS: As part of a larger study in the psychology of the teaching process, will you please furnish the following estimate of yourself? The most accurate result will be obtained if you adopt a critical and dispassionate attitude toward your own life.

1. If you compare yourself with others of the same sex and age, how would you rate your own *general happiness?* Use this definition as a guide: "A relatively permanent state of well-being characterized by dominantly agreeable emotions ranging in value from mere contentment to positive felicity." Give due weight to both inner and outer factors or manifestations.

Place a cross (X) on the line below to show where you belong. This mark may be placed *between* as well as *at* the descriptive phrases. Think of your *average feeling or condition over several months,* and try to view yourself as objectively as possible.

[1] Raymond Dodge, *History of Psychology in Autobiography,* vol. I, Worcester, Mass., Clark University Press, 1930, pp. 119–120.

| | | | | | | |
|---|---|---|---|---|---|---|
| most unhappy of all | the *great* majority of persons are happier than you are | a *slight* majority of other people are happier than you are | about average | somewhat happier than the general run of mankind | far happier than the great majority of human beings | happiest of all |

2. Where do you think your *friends* would rate you? Make a circle (o) on the same line above to show where you think they would put you, whether at the same point at which you rate yourself, or higher, or lower.

After the first self-rating, each subject was given four envelopes bearing his name and containing a longer rating sheet to be submitted to four friends whom he considered knew him well enough to judge him with respect to these traits. In addition to the happiness item this blank made provision on a similar basis for estimates of "efficiency" and "sympathy," both qualities which, it was felt, might have some bearing upon the degree of happiness possessed, and which at present can be measured only by this method (see the blank below). After collecting the sealed envelopes containing the ratings by his acquaintances (which usually required one week), the subject returned them to the experimenter. The novelty and intrinsic interest of the task insured excellent co-operation.

Associates' Rating of .....
(Insert full name of person who gives you this)

DIRECTIONS TO THE RATER: This is part of a study which promises to have some significance for the psychology of the teaching process. You are asked to rate your friend confidentially and in good faith with respect to three highly important features. When you have done so seal the envelope and return it to the person you have rated who will in turn convey it to the appropriate instructor. Do not sign your name and remember that your judgments will not affect academically or otherwise the standing of either yourself or your friend. You are merely aiding in an interesting investigation.

I. HAPPINESS — If you compare him with others of the same sex and age, how would you rate your friend's *general happiness*? Use this definition as a guide: "A relatively permanent state of well-being characterized by dominantly agreeable emotions ranging in value from mere contentment to positive felicity." Give due weight to both inner and outer manifestations.

Place a cross (X) on the line below to show about where he belongs. This mark may be placed *between* as well as *at* the descriptive phrases. Think of his *average feeling or condition over several months* and try to view him as objectively as possible.

| | | | | | | |
|---|---|---|---|---|---|---|
| most unhappy of all | the *great* majority of persons are happier than he is | a *slight* majority of other people are happier than he is | about average | somewhat happier than the general run of mankind | far happier than the great majority of human beings | happiest of all |

II. EFFICIENCY — Place a cross on the line below which best represents your estimate of the subject's possession of the trait of efficiency. Be as fair and impartial as you can, and ask: Can he perform (and *does* he!) promptly, smoothly, and adequately a great many tasks, originating either with himself or with others? Remember that the cross may be placed at *any* point on the scale.

| | | | | | | |
|---|---|---|---|---|---|---|
| utterly incompetent to discharge any obligation | very lax and irresponsible | not as reliable as one would like | average capacity for managing affairs properly | handles matters with more than ordinary competence | responsible and reliable in executing assignments | extremely efficient in all duties |

III. SYMPATHY — Place a cross on the line below which best represents your estimate of your friend's possession of the trait of *sympathy*. Ask yourself: To what extent does he participate in the emotional experiences of others, *i.e.*, how much *compassion* and *genuine kindliness* does he exhibit in his human relations?

| | | | | | | |
|---|---|---|---|---|---|---|
| wholly devoid of sympathy; brutal | callous and definitely unkind | indifferent | ordinary interest in others' problems | distress of others understood and appreciated | marked feeling of kinship with the "underprivileged" | borders on the saintly in word and act |

* LOOK OVER EACH ITEM AGAIN AND SEE IF YOU HAVE BEEN AS OBJECTIVE AS POSSIBLE!

A number of interesting facts emerged when this material was subjected to the customary statistical analysis. Seventy-five per cent of the group rated themselves as possessing happiness equaling or exceeding that of the average; 86 per cent placed their friends' esti-

mates of their (the subjects') happiness at average or above; 96 per cent were said by their acquaintances to reach or exceed the mean for efficiency; and 94 per cent of the group were rated as having average or more than average sympathy. This indicates either that college undergraduates are happier, more efficient, and more sympathetic than the mass of mankind, or, as seems more likely, that there is a constant tendency to overestimate. If so, it is a fortunate, if curious fact that most people consider themselves (and are deemed by others) happier than the mass of mankind.

Table VIII presents the more significant intercorrelations obtained from the rated traits. As anticipated, the highest *r* is between the two self-estimates of happiness taken one month apart. While this correlation is strictly a measure of stability or consistency rather than of reliability in the conventional sense, it can probably be interpreted as such without undue violence to the concept. The lowest *r* is between efficiency and sympathy, a plausible enough result since many persons in an effort to be efficient at all costs probably create an unsympathetic impression, thus reducing the positive relationship normally found between most good qualities. Fair agreement among the opinions of friends is revealed by the *r* of one pair with another (0.68), nearly as high as that of the self-estimates themselves, the value of which it theoretically could not exceed. At any rate, it is consoling to find that happiness can be more consistently rated than either efficiency or sympathy, a fact which is made more striking when one remembers that efficiency belongs to a class of traits that can be judged by more concrete and objective standards than most others. The most disconcerting fact is the low *r* of 0.34 between the self-rating and the mean of the associates' estimates of happiness. Evidently a wide disparity can exist between *attributed* and *experienced* felicity.

Most of these test values (below the dash line in Table VIII) are disappointingly low and only the ones for neuroticism and ascendance can be considered to lie beyond the conventional P.E. limits. This suggests that *emotional health* is the most important single

*Table VIII. Product-moment Correlations between Happiness and Other Personality Traits* [1]
($N = 195$)

| Correlated Variables | $r$ | P.E. |
|---|---|---|
| First self-estimate and second self-estimate (one month later). | 0.70 | 0.045 |
| First self-estimate of others' views and second self-estimate of others' views (one month later) | 0.59 | 0.06 |
| First self-estimate of happiness and mean of associates' estimates thereof | 0.34 | 0.04 |
| Self-estimate of associates' estimates and actual average of associates' ratings | 0.415 | 0.04 |
| Mean of first two associates' estimates of happiness and mean of last two | 0.68 | 0.04 |
| Joint happiness criterion and average of associates' ratings for efficiency | 0.383 | 0.04 |
| Mean of first two associates' estimates of efficiency and mean of last two associates' estimates | 0.57 | 0.043 |
| Mean of first two associates' estimates of sympathy and mean of last two associates' estimates | 0.53 | 0.042 |
| Joint happiness criterion and average of associates' ratings for sympathy | 0.303 | 0.04 |
| Efficiency average and sympathy average (estimates of acquaintances) | 0.232 | 0.045 |
| Joint happiness criterion and: | | |
| Neurotic tendency (Bernreuter) = | − 0.26 | 0.04 |
| Ascendance submission (Bernreuter) = | 0.19 | 0.046 |
| Self-sufficiency (Bernreuter) = | 0.05 | 0.05 |
| Theoretical attitude (Allport-Vernon) = | 0.05 | 0.05 |
| Economic attitude (Allport-Vernon) = | 0.02 | 0.05 |
| Esthetic attitude (Allport-Vernon) = | 0.00 | 0.05 |
| Social attitude (Allport-Vernon) = | 0.04 | 0.05 |
| Political attitude (Allport-Vernon) = | 0.06 | 0.05 |
| Religious attitude (Allport-Vernon) = | 0.15 | 0.05 |
| Intelligence (DeCamp) = | 0.13 | 0.05 |
| Teaching interest (Strong) = | − 0.02 | 0.05 |
| Prejudice (Watson) = | 0.09 | 0.05 |

[1] G. W. Hartmann, Personality Traits Associated with Variations in Happiness, *Journal of Abnormal and Social Psychology*, 1934, **29**, 202–212. This is an extension of an earlier pioneer study developed by Goodwin Watson.

factor associated with happiness, but it is far from supporting the view of the more enthusiastic mental hygienists that it is the *sole* producer of it. The dominant individual apparently has slightly greater chances of being happy than the submissive person, a finding which is hardly comforting to an advocate of traditional Christian ethics.

It is especially noteworthy that with the exception of the religious attitude none of Spranger's six value types (as diagnosed by the Allport-Vernon profile) seems to be more conducive to happiness than any other. Evidently the nature of one's ideal is an irrelevant matter: The good, the beautiful, and the true are on equal footing as far as their capacity to foster bliss is concerned. To the writer's knowledge, this is the first experimental evidence against the Aristotelian ethic which held that "pure speculation" is the *summum bonum* for all!

The positive conclusions to be drawn from this inquiry are that happy individuals in this population category tend to be relatively more efficient in the management of their affairs, more sympathetic and kinder in their responses to other persons, and less disposed to report neurotic symptoms about themselves. Their emotions are not different from, or weaker than, those of their unhappy (really, less happy) associates, but they do seem to be better regulated and directed, with the result that their feelings of pleasantness are more numerous and more prolonged. The educational significance of these findings is far from negligible. If the school, like other human institutions, exists to further our happiness, then it can do so in part by building competence in many apparently minor capacities, by cultivating attitudes of helpfulness toward others, and by corrective and preventive work in the broad field of mental hygiene. Mental health is essentially emotional health. Like physical or simple "bodily" health, with which it is intimately related, it is an outcome of the "wholesomeness" of the total organism. Teachers and pupils alone cannot do all that is needed for the attainment of this all-important end, but they can test every item of a pedagogical character in terms of its contribution to this goal.

## EDUCATIONAL USE OF THE EMOTIONS

In contrast to the position just outlined, the unvoiced tradition of the American school system looks upon the emotions of a child as aspects of behavior that must either be neglected or rigorously curbed.

Just as the ascetic medievalist looked upon the body generally as an annoyance and as something to be chastised and kept in subjection, so the usual operations of our educational system have viewed the emotions as something outside of their domain where they have not been scorned as something low and obnoxious. The reasons for this lie deep in our cultural history, but contemporary events have compelled a reorientation in this respect. As soon as educational psychology committed itself to dealing with the growing organism as a unit, the wellnigh exclusive intellectual or cognitive emphasis characteristic of its earlier stages was replaced by a broader outlook that embraced the noncognitive phases of experience. The school boy did not merely learn that Thomas Jefferson wrote the Declaration of Independence in 1776 — he also acquired an admiration for the man who could express such magnificent ideas in such superb prose. Equally clear was the less pleasing fact that this same youngster under certain circumstances would read the Old Testament not because his piety or scholarship were primary goods, but because he had been told that some "hot, juicy," episodes told in frank uninhibited language were scattered throughout its pages.

The best current view supports strongly the effort to make vivid experiences a more prominent part of the educative process. Classroom life does not have to be drab and dull to accomplish its social purposes; indeed, such an atmosphere is thick with emotion, but unfortunately of the enervating and depressing variety. Mildly exciting emotions, on the other hand, have a tonic effect, the organic consequences of which are usually desirable. One gifted professor is said to have taught literature in such a fashion that the routine of the course became a series of "hair-breadth escapes." In some hands, such a method may become pure sensationalism or degenerate into an emotional "debauch"; but this is no reason for depriving students of a real "thrill" or "kick" in their scholastic activities. The emotional starvation induced by many formal curricula was unquestionably one of the forces leading to the lush growth of a miscellaneous body of extracurricular pursuits where a pupil's feelings had more

opportunity to be expressed. Inherently even the driest and deadliest content of any subject was once exciting material to those who first dealt with it; the preservation of its freshness and vitality is indispensable to "good" teaching, *i.e.*, instruction that is psychologically sound.

This is not an impossible or romantic ideal. It is true that life, whether of the school or nonschool variety, is not constantly lived on the mountain tops of a succession of climactic experiences — affective valleys, plateaus, and even abysses are part of the emotional scenery; even peaks themselves arise because of the contrast produced by some lowlands. Practically what is demanded is that the general level of feeling be kept high. This more often will approximate a state of quiet pleasure than one of sheer ecstasy, although the strange fear of the ecstatic that still prevails within the profession and the culture is probably one of the reasons why it is so uncommon. Where teaching is truly artistic it cannot fail to evoke an esthetic response in those who are taught; and it is the very nature of the esthetic that it represents the culminating experience of which the human organism is capable. The highest moments of life are accompanied by an emotional glow that lingers when the event itself is gone. To debar such feelings from the educative process is to condemn it to be less than it might be.

## THE PROBLEM OF FEAR AMONG PUPILS

Foremost among the emotional conditions with which educators must grapple is the fear response. This is a reaction which arises whenever the security of the individual is in some way threatened. Anxieties of all sorts have multiplied to an astonishing degree in a period when so many of our social institutions and patterns of living are disintegrating before our very eyes. The number of dependable things seems very much reduced. This social "climate" affects both young and old and the specific fears that arise among school children are largely symptoms of this field process.

The relationship between fear and insecurity may be expressed by

stating that insecurity is milder, chronic, and largely cortical in its determination while fear is intense, acute, and primarily visceral in its manifestations. The demand for security is essentially a need to be protected from situations that might hurt the living system and is clearly a legitimate want that deserves to be satisfied. A young child has a right to expect that he will be kept from fear-producing stimuli; deliberately to awaken this crippling emotion in him for the sake of social control is barbaric and cruel to a degree usually not appreciated by those who are guilty of this behavior. Although it is dangerous to suggest that fear should *never* be instilled if improvement of conduct is intended, educational psychologists today generally view fear as a crippling and debilitating experience. A frightened child is a pitiable sight; and an injunction to eliminate fear from school life is one of the first commandments an educator must learn.

In the preceding section, we emphasized the fact that certain feelings and emotions make richer and more meaningful the work of the school. But this is true only of those affective states conducive to the establishment or maintenance of happiness. Fear is not one of these; indeed, it is one of the chief sources of human misery. The production of fearless human beings is a worthy ideal for modern education even though it remain literally unattainable. An unexpected loud noise, loss of support, and sudden sharp pain are primitive situations that regularly awaken the " emergency-mobilization " reaction of fear. But apart from these unavoidable " irreducibles," most fears are needless and serve no useful human end. The fear of addressing a large strange audience, the fear of sleeping alone, the fear of examinations, and the fear of other people — to mention just a few common ones — are usually intense reactions which lower a person's comfort and injure his social efficiency. If the school is to be a " happiness institute," it must direct much of its efforts to the prevention and elimination of fear, for this emotion is inimical to a pupil's well-being. Even the suggestion that a redirection of fear is all that is needed or possible is not enough. It is quite true that the " serpent that strikes man's heel " is now microscopic and that a fear of noxious

bacteria is today more adaptive than a fear of snakes most of which are harmless. A calm recognition of the hurtfulness of disease and the search for its causation is far more likely to lead to its conquest than a panicky reaction to the word "typhoid." Similarly, a simple fear of war and all its attendant horrors is not a promising means of so organizing world affairs that this malady disappears. To grapple effectively with both problems requires skills, insights, and even motives that fear itself is powerless to create.

**How to combat fears.** Empirical studies of children's fears show clearly that the acquisition of competence results in the diminution of fear and not that fear as such leads causally or normally to the acquisition of abilities. Fear elicits vigorous random activity and not thoughtful, purposive behavior. Fear of the water (*i.e.*, fear of drowning) usually subsides with the attainment of good swimming capacity; it is a bit absurd to claim that most qualified swimmers are made such by the push of negative fears rather than by the positive pull of the satisfactions and pleasures of vigorous bodily activity in the open air.

The following recommendations from the researches of Jersild in this important area are arranged in descending order of usefulness. Note how the favored devices harmonize with a theory of knowledge which emphasizes its eventual translation or culmination in action, whereas the less satisfactory techniques provide for neither the development of understanding nor mastery of the fear-producing situation.[1]

A. Most helpful
   1, Prompting the child to acquire skills that may be of specific aid to him in coping with the feared situation;
   2, Leading him by degrees into active contact with and participation in the situation that he fears: presenting the stimulus at first in a less intense form, or without some of its most frightening features, or in conjunction with reassuring features, and then gradually introducing all of the conditions that initially evoked fear;

[1] Arthur T. Jersild and Frances B. Holmes, Methods of Overcoming Children's Fears, *Journal of Psychology*, 1935, 1, 101–103.

3, Giving the child an opportunity to become acquainted with the feared stimulus on his own accord, by making it readily accessible to him in his normal environment, but under circumstances that permit him to inspect or ignore it, approach or avoid it, as he sees fit.

B. Useful auxiliary methods

4, Verbal explanation and reassurance;

5, Verbal explanation and reassurance plus a practical demonstration of the nature and harmlessness of the thing that is feared;

6, Setting an example of fearlessness in the child's presence;

7, Efforts to effect "positive reconditioning" by presenting the feared stimulus in association with an attractive stimulus;

C. Ineffective when used alone:

8, Ignoring the child's fears;

9, Coercing the child into contact with the feared situation by means of physical force, scoldings, ridicule, or invidious comparison;

10, Completely removing the cause of fear for the time being, or offering palliatives for the child's symptoms of fear.

The security needs of children (and adults, too) are much more numerous and complicated than the elimination of gross fears suggests. They seem to be related to a larger but more subtle need which may here be labeled as the "need for orientation." A person finds it desirable to know where he is in this world and how he stands with his fellows. To be "lost" in either respect is to be in an uncomfortable frame of mind. Not to be spatially, temporally, and socially oriented is to be deprived of the prime conditions for effective life and growth. Education through the physical, biological, and social sciences does much to establish this sense of "at-homeness" in time, in space, and in the human structure of the community. Too frequently, however, this is done without integrating each pupil with the little social universe about him; some children are *in* the classroom, but not *of* it. Emotional insecurity of this type vanishes when a warmer and more intimate "atmosphere" is established and no one is left outside of the group life. Such reliable orientation toward things and persons

goes far toward banishing fear in the pupil. In a world where natural law and order are plainly discerned fear tends to a minimum. If the sun were to be found to rotate about the earth and the principle of evolution demonstrated to be an utter fraud, the insecurity feelings of the contemporary scientist would mount enormously while he sought to reorient himself to an entirely different world. By keeping people oriented to reality, education helps to keep them unafraid.

## THE TREATMENT OF ANGER

Another major emotion is anger. It really should be called an emotion complex since angry reactions appear in many disguises and it requires a high level of generalization to identify the different forms of this reaction correctly. The experience of anger usually arises whenever any existing impulse or purpose-in-action is blocked in moving toward its goal. As distinct from fear — which is characteristically a submissive form of conduct indicative of the fact that the situation has overwhelmed the organism — anger is typically an aggressive response in which the system directs its energy toward the conquest of the provoking stimulus. This difference alone suggests that anger is a healthier adjustment than fear, although the contrast should not be too sharply drawn. Perpetual anger is almost as bad from a mental-hygiene standpoint as unremitting fear.

The conditions under which anger arises are as numerous as the occasions of frustration or thwarting to which the individual may be subjected. Consequently, the emotion is harder to handle than fear. It may range all the way from a slight irritation with a telephone caller who rings during a family meal to a "towering rage" against some person who has done grave injury to one's pride. The frequency with which persons regret having given vent even to outbursts of "righteous" indignation implies that anger provides but temporary relief to an overcharged organism and that as a method of releasing tension it is far from satisfactory. At the risk, then, of seeming to be even more utopian than in the case of fear, we may accept the judgment that anger, too, is an emotion which education must not alone

curb but wherever possible turn into something more serviceable to our basic wants.

Careful studies of the circumstances under which anger occurs show that it is more likely to appear when one is tired and hungry than when one is rested and fed. It is a distress reaction exhibited by a very young baby under similar conditions to those which evoke essentially the same response in the adult. A fatigued teacher is notoriously apt to be a "cross" teacher, and it is equally clear that weary and hungry youngsters are prone to be restless and surly. The physiological basis of this kind of "irritability" is quite clear, and the only precautions that can be taken are (1) to restore the system to a fresher state, (2) to arrange the daily schedule so that no important duties must be discharged at a time when one's threshold of tolerance is low, and (3) to sharpen the individual's awareness that anger is increasingly probable under certain conditions and by a coincidental appeal to the humorous insight of seeing oneself disposed to act as predicted to evoke counter or inhibitive forces which prevent the emotion from rising to the surface. Of course, it will do no real good to check the response at the point of origin and then have it whirl about subterraneously and then "explode" on another occasion. Chopping wood or walking a long distance are performances which empirically have the effect of dissipating in a harmless way the confined energy that might otherwise blow up in an embarrassing manner; in such cases induced fatigue diminishes rather than increases irritability.

However, even well-rested and properly fed children and adults get angry; other devices must therefore be employed to deal with these situations. Anger, viewed in retrospect, makes the participants seem either comic or tragic; since neither role is attractive, the maintenance of a longer range time perspective (where this is established as a fairly constant mental set) greatly assists in reducing the emotion's intensity. The cortex does dominate the thalamus (the "center" of affective co-ordination) and this neurological fact provides education with an all-powerful lever for regulating a difficult situa-

tion. It is literally true that most persons when angry do not look well or act well, and this esthetic objection serves to reenforce the more strictly intellectual control previously mentioned. Finally, there is the ethical objection that the angry individual, even when understandably and pardonably excited, is a source of pain to others; since anger adds to human friction rather than diminishes it this constitutes a powerful argument against its expression. These things may be hard to make clear to others in the moment of anger itself; the best psychic therapy is achieved when the individual is prepared in advance to behave adaptively under conditions of stress.

Moreno's therapeutic stage could profitably be employed to deal with school children's problems of regulating anger by providing frequent innocuous outlets through dramatic roles. The chronic grouch in the class may be assigned to play the part of a grumbler in some simple play and the resultant insight often cures the student of an ugly symptom. Cartoons and caricatures have a similar function, although it should be emphasized that the cartoonist and not the subject he draws is the one commonly benefited by this program! In general, artistic or esthetic expression of any kind seems better than the crude manifestations of immediate anger. If the emotion cannot be prevented from arising in some form, the next best thing is to sublimate it as quickly as possible.

As early in life as one can begin, children should be taught to view the situation causing anger as a " problem " and encouraged to find a different solution than the one usually offered. Conflict is a central fact in all social living, but to conduct the struggle in terms of bitter hostility usually makes a reasonable solution harder to find and accept. The human race will some day be ashamed of the battles that it has witnessed within itself and resolve them in the impersonal struggle of the species as a whole against its natural adversaries. Anger is more than a serious personality problem — it is also a grave social issue. A well-conducted life should provide very few instances of the appearance of this emotion, even though the provocation be great.

## THE REGULATION OF SEXUAL BEHAVIOR

In the past, it has been customary for educational psychology to refrain from any direct discussion of the erotic interests and activities of school children. The problem has been left almost exclusively in the hands of parents, clergymen, social workers, court officials, and medicopsychiatric personnel, partly because such groups have been traditionally presumed to be equipped to deal with such questions and partly because psychologists, although themselves largely engaged in educational work, have felt that this was too dangerous and awkward an issue to be handled. Educational and clinical psychologists, like other members of the social group, are subject to the pressure of the current mores and folkways, and until relatively recently these influences in American culture have enjoined schoolmen to be silent about the reproductive life of man. This neglect has had many lamentable consequences for human welfare in general and for education in particular. Fortunately the evidence is overwhelming that the schools can operate in this area in a scientific, scholarly, decent, and progressive manner and we may expect the coming years to find teachers and pupils giving realistic attention to the place of the sex factor in personality formation rather than dealing with it apologetically and surreptitiously. The "education of the whole man" is not complete without some concern for the way in which the men and women of each generation produce the men and women of the next.

Earlier in this chapter the desirability of abolishing the occasions for fear and anger in the experiences of school children was stressed, largely because these two emotions are responsible for an extraordinary amount of human unhappiness. However, erotic excitement, whether faint or intense, is not similarly destructive of human values; on the contrary, despite all the ugly complications in human affairs connected with it because intelligence and kindness have often been missing from the pattern of behavior in which it appeared, there can be little doubt that the total effect on balance of its presence has been beneficial. To deny this is to deny the value of human life itself —

a nihilistic attitude that is entirely conceivable, but one that we act upon only in the most compulsive of suicidal moods. Obviously, education begins with the assumption that human existence contains potentialities for good, otherwise its efforts at personal and social improvement would be pointless; and if individual human life is a good, the reproductive drives that initiate it must also be positively evaluated rather than negatively condemned.

The principal psychological barrier to the extension of sex education is to be found in the heavy emotional loading attached to the vocabulary in which it has to be conducted. This vocabulary usually refers to organs or functions, the very mention of which *may* associatively arouse some mild erotic feeling or, what is far more likely under existing social circumstances, some measure of embarrassment. Since this latter state is not a comfortable one, a tendency to avoid concepts and language provocative of embarrassment in oneself and others is encouraged. Polite Victorian society had an unwritten but rigid rule that ladies and gentlemen could discuss among themselves any topic under the sun save three, *viz.*, politics, religion, and sex; unfortunately these three are among the most interesting and important matters that concern us. In an effort to avoid animosity and controversy, "live" matters were passed by in favor of more neutral and "harmless" themes — a practice and point of view which contemporary education has largely repudiated.

If, however, one looks upon all forms of human experience with the eye of one describing the phenomena of nature and seeking to turn them toward the improvement of the quality of living, many of these apparently insurmountable difficulties are greatly reduced. The understanding and feeling of an individual who had been appropriately educated in sex matters since babyhood would then follow a course similar to this:

**Mental hygiene and the sex question.** Boys and girls would be treated very much alike in the preschool period. In the best nursery schools they share the same toilet facilities and if necessary, dress and undress in each others' presence if that should prove the convenient

and normal thing to do. Each child would learn incidentally, or be told simply in response to questioning, that he was developed in the lower part of the body of the mother and that when he became too big a baby to be carried around comfortably inside, he came out through the hole below her "tummy." Usually this provides the child with all he wants or needs to know about his own origin before the first grade is reached. The child ordinarily learns that boys and girls differ slightly in appearance, particularly around the genitals, but these conspicuous variations in structure he commonly explains to himself as differences in methods of elimination — which is indeed all they actually amount to before functional maturity is achieved. He will know that boys become like father and girls like mother, that only girls are so made that babies can grow inside them. He will know what the immature and the mature male and female bodies look like, but neither his interest nor his knowledge is likely to go much further unless some traumatic incident initiated by an older child or an adult should prematurely force the emergence of an inappropriate emotion or create an insight well before its natural time of appearance. Most of the rich and precocious sexual imaginings which certain psychoanalysts have attributed to preschool children are probably mythical and certainly unrepresentative, even making due allowances for the suppression mechanisms which must be expected to begin work very early. In general, the preschool child confines his efforts to occasionally "figuring out" what must needs be a very unclear situation, but there is very little ego involvement throughout as the whole business is a matter of pure curiosity. An elaborate and detailed exposition of the birth process at this age while innocuous is usually pointless since the child is generally unable to comprehend and retain the details, and the story has to be told over again at a later age when his broader background permits assimilation of these biological items.

The critical role of the father necessarily remains a mystery, although there is nothing baffling about his failure to fit into the family picture because this question does not become acute until the ele-

mentary school years. Some time between 6 and 10 (earlier with bright children and later with duller or more "protected" ones) the youngster discovers that the father must do something to the mother before the baby can be started; if acquainted with the complementary physical structure of the reproductive organs of the two sexes he has no trouble in appreciating concretely how this connection is brought about. However, at this point in his inquiry — say around the 7th or 8th year — it is usually necessary to supply in written or oral form the crucial information that the father's body discharges a fluid in which living "seeds" swim, which, when poured into the mother's body by the obvious mechanical route, provide the beginnings of a new human being. Conceptually, the problem is now solved, although, of course, many anatomical and physiological details will later be added. Under normal circumstances, child companions slightly more advanced in understanding assist the younger person with hints or outright accounts, although these are often less useful than they might be because of the superstitions and inaccuracies that creep into the telling. No one should regret the fact that children learn from each other; what is important is that the group as a whole be *properly* informed. The tone and manner in which the "tale" is transmitted is of primary concern; perhaps the best approach resembles that used in describing how an automobile works, what makes rain, and how trees get their food from the soil. These natural events are also impressive in their own right; though not as "exciting" as material concerning ourselves, it is helpful if this latter information is also seen as part of the regularities of the world order.

In the immediate preadolescent years, the true erotic feeling of later life makes itself felt in the form of "warm" or prickly sensations periodically centering about the genitalia. These probably do not develop fully until the glandular and chemical changes of puberty are well under way, organic processes which make more meaningful the bare facts of reproduction earlier known to the individual. In the boy the spontaneous erection and hardening of the penis antedates the night-time discharge of sperm; the handling of this organ which

is all but inevitable during its swollen state is the basis for the adjustment problem of masturbation, although the best professional opinion no longer considers this to be as disastrous as was once believed. In the girl a corresponding congestion in and about the vulva leads to rubbing or friction with similar results in relieving the tension internally created. With both sexes, it is usually clear that the presence of the other is demanded if the intermittent irritation from which each suffers is to be most satisfactorily discharged. The effort to accommodate to this situation by abstinence or deprivation is one of the hardest struggles with which healthy high-school youths are faced and one that needs all the sympathy adults can muster.

The sex problem is most acute between the 13th and the 25th year of life, largely because an exceptionally high amount of bodily energy is channeled into these pathways during that period and because social, economic, and religious sanctions all conspire to forbid or to limit its expression. No junior and senior high school or college is doing its full job for its students if it fails to assist them in resolving this difficulty. The combination of sexual maturity and occupational immaturity extending over a decade of vigorous youthful life is all but intentionally designed to violate the most fundamental precepts of mental hygiene. Innumerable adaptations of varying degrees of merit are made to this predicament. Early marriage between individuals who are intellectually and temperamentally and physically well mated is the solution that seems best to conserve all the biological and social values involved, but only a fortunate few appear to be able to arrange for this preferred response. Contraceptive devices are now widely understood and there is little doubt that they have encouraged temporary and experimental unions, the usefulness of which is still uncertain. Deliberate promiscuity on the part of either sex is abnormal, at least in the statistical sense, and usually points to some personality barrier to genuine happiness. Patronizing prostitutes is an ancient method [1] of satisfying an imperious " need of the

[1] A number of the greatest medieval universities, usually dominated by the clergy, were supported in part by the income from local municipal houses of prostitution, a form of endowment that seems very odd to twentieth-century eyes.

flesh," but neither prostitutes nor their customers look upon this as anything other than a "second best." Homosexuality is a clinical puzzle in itself, but also a sample of the need for tolerance in appraising many of the inferior modes of sexual adjustment into which individuals fall when their normal emotional development is hampered. Psychologists have no a priori right to insist that life-long monogamous marriages are the only happy ones conceivable, but matched against the alternatives commonly attempted, it comes out distinctly in first place. Under these circumstances, it seems but proper that our educational program should be directed toward making this form of family organization as successful as possible by building attitudes and controls early in life favorable to this outcome.

Most of the boys and girls now in the nation's schoolrooms will some day be married and most of them will sooner or later be parents. The preparation to be a successful wife and mother or an adequate husband and father must begin long before these roles are actually assumed. A sense of the continuity of the life stream and a certain satisfaction in participating in the process results if the training for family and parenthood functions is competently executed. However, without the disciplining of the sex emotion this prized achievement is jeopardized at the very beginning.

The secondary-school years are usually decisive in setting the pattern of sex behavior that is later followed. Young people at that period can be helped to establish ideals of health, strength, and beauty which mean so much for courtship by reference to the high but not unattainable standards of excellence presented in history, biography, and the poetry and prose of all nations. The sense of being a male or a female need not lead to any untenable notions of the superiority of one sex to the other with the ridiculous antagonisms that mar their relationships, but they can instead serve as the constitutional basis for friendly and benevolent gestures toward all persons. Most folks give and receive affection of a simple kind far less frequently than the full happiness of the individual and the group requires. A broad sublimation of the erotic impulse diffused in the form of pleasant courtesies between all males and all females regard-

less of age or inherent attractiveness may do more than anything else in our natures to maintain a joyous mood, the basis of so many other valuable accomplishments.

## PROMOTING EMOTIONAL MATURITY

One method which educational psychologists have developed for assessing the affective adjustments of an individual is to refer them to some age norms. Thus, a temper tantrum may be a normal although unlovely exhibition of the frustrated feelings of a 2- or 3-year-old, but its appearance in a sixth-grader is distinctly a sign of gross disorganization and lack of cortical control. A panicky fear of the dark is common enough among preadolescents, a sheer census datum which makes it part of some "standard," but an equally intense fear in a middle-aged teacher has a pathological quality. Although the concept is much more tenuous, there is little doubt that emotional retardation akin to mental backwardness is a phenomenon of uneven personality growth.

Emotional immaturity is essentially a failure to achieve the expected integration and differentiations displayed by ordinary affective behavior. Maturity as an achievement is to be prized only in relation to the life history of the organism being judged. A healthy, happy, 2-months-old baby is as perfect *in his way* as a vigorous masterful adult is in his. The emotional life of the new-born infant is simplicity itself, being little more than general excitement with either a distress or a delight component, with fairly rapid transitions from one to the other. Especially noticeable is the lack of gradation, *i.e.*, the tendency of the young organism to be either happy or unhappy without regard to the proportionate intensity of the exciting stimulus. In older organisms, the feeling reaction tends to be "scaled" in keeping with the originating cause. These distinctions make possible a variety of shades and nuances of affectivity in the adult that are lacking in his earlier state. The education of the emotions is to a marked degree the development of the capacity to respond *differently* and *differentially*, in the double meaning of both these terms.

When is a pupil emotionally mature? This is a difficult question to answer since the criteria of affective maturity are complicated by the differences in opinion among presumably qualified judges. Here is what Prescott has to say on the topic: [1]

Mandel Sherman has suggested the following as a definition of emotional maturity:

"Emotional maturity, for an individual, may be regarded as the state of being prepared to make choices of an emotional nature when freed from the routinized supervision of those responsible for him."

This definition has the great merit of implying that maturity depends upon mental conditions within the individual which mediate his choices. Besides physiological conditions, these could be only attitudes and value concepts which determine the state of cerebral gradients in the various situations. But the question of which attitudes and value concepts mark maturity remains unanswered. Some criteria of mature behavior must be accepted before the "normal" behavior range can be established. These criteria could be genetic, that is to say, physiological; they could be social or cultural; or they could be ethical or religious.

A *genetic criterion* of mature behavior would demand the achievement of patterns of affective behavior that are effective in resolving physiological tensions and disequilibria and that result in a strong hedonic tone of pleasure in the carrying out of fully integrated behavior.

A *social or cultural criterion* of mature behavior would demand the achievement of patterns of affective behavior such as are common and accepted within the population of a given area, and the avoidance of patterns of affective behavior which run counter to the mores or which arouse tension and antagonistic action in a considerable number of other persons.

An *ethical criterion* of mature behavior would demand the achievement of patterns of affective behavior that conform to certain basic value principles which are accepted by a given individual or population, and the avoidance of patterns of affective behavior that are contrary to these value principles in their effects upon oneself or upon others.

[1] Daniel A. Prescott, *Emotion and the Educative Process*, Washington, D. C., American Council on Education, 1938, pp. 97–98.

These criteria are often not harmonious within themselves and lead to agreement only in extreme instances. Thus, an adult who is constantly either frightened or angry and devoid of all sex emotion would certainly typify an astonishing affective organization, whether one called it " immature " or not. A much less clear case is the differ-

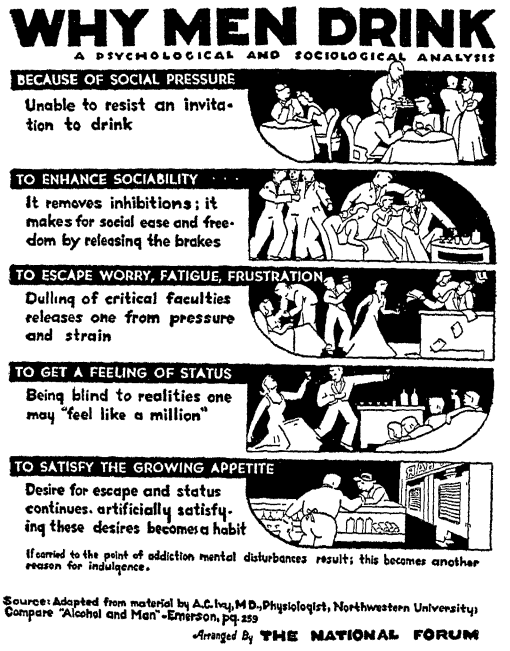



FIGURE 29

Graphic material illustrating the problem of " emotional maturity."

ence in emotional level between the pacifist and the " militarist " or nonpacifist. The writer is disposed to see in pacifism a higher and more advanced kind of emotional reaction than that exhibited by most members of warring nations, although this is obviously a minority view since most educators and psychologists at the present time are not personally pacifists.[1]

[1] Perhaps one should add that *proportionately* there are more pacifists among educators and psychologists than among the general lay population. Differences in educational opportunity undoubtedly contribute heavily to this changed ratio.

Emotional maturity should not be confused with the absence of emotionality. Football games may properly awaken the excited interest of adolescents (and of those who have long ceased to be such), but when defeats in a mere game lead to profound gloom and victories to unreasonable exultation, then a loss of balance in affective response is plainly involved. Contrariwise, the insensitivity of many otherwise estimable young people to the low standard of living found among 90 per cent of the world's population is more a mark of ignorance and defective sympathies than a sign of controlled emotion. School children who are led by their textbooks to gloat over the slaughter of the "enemy" and the greater destructive skill of their side, *i.e.*, the national group with which they have identified themselves, are being condemned to a lower level of emotional experience than appears in those who independently or with assistance react to the same situation by regretting the loss of human life and treasure no matter where it occurs and who are energized to act to prevent such destruction.

## THE CULTIVATION OF LOYALTIES

The improvement of the emotional life cannot disregard the highly significant fact that the human being is so constituted that he achieves a deep satisfaction in sacrificing himself for some cause to which he is devoted. By losing the self in something larger than the organism's obvious and immediate interests, the individual wins a measure of "realization" or contented fulfillment found in no other way. Certain cynics have been disposed to deny the existence of this aspect of man's nature, but the denial itself is a revelation of shallow understanding and narrow experience. The sacrificial behavior associated with advancing some great movement — political, religious, scientific, literary, etc. — may really represent the highest form of happiness attainable and thus justify itself even in the light of the simplest hedonist or eudemonistic philosophy. Youth particularly admires this ideal of the "heroic man" and it would seem to be the most elementary educational wisdom to see that this noblest of urges is not harnessed to other than intellectually defensible objectives.

To appreciate this loyalty reaction, it may be necessary to restate briefly a modified Freudian classification of human needs: (1) the id needs; (2) the ego needs; (3) the superego needs; (4) the enlarged-ego needs. The *id* needs represent those demands of the organism which must be met if the body itself is to survive and be reproduced, *viz.*, such requirements as the need for air, food, rest, freedom from pain, and sex gratification. The *ego* needs center about desires for ability and achievement or status and prestige — wealth, fame, and power in the older triad; most of these probably cater to the more fundamental id needs, but they also represent certain independent emergents in behavior. The *superego* needs refer to those which were originally part of the culture but have become interiorized and adopted by the individual as his own, such as the restraints or compulsions imposed by feelings of decency, standards of honesty, and related moral controls. The *enlarged-ego* needs are those involved in the conviction that the advancement of the good of the group with which one is identified is a means to improving one's own satisfactions. It is this last category of needs which embraces the "loyalty-to-a-cause, movement, or idea" feeling.

**Satisfying the "whole man."** The history of different culture epochs suggests that major cultures have generally been built upon the acceptance of some of these needs and the rejection of others. Thus, historic Christianity — at least during the Middle Ages — represented a concentration upon superego needs and a distinct repudiation of the id and ego needs. The man of the Renaissance, on the other hand, glorified his ego wants, a tendency continued in the later industrial and technological era which devoted itself largely to the fulfillment of the needs in Classes (1) and (2) to the neglect of those included under Classes (3) and (4). All of these social systems were unstable or inadequate, because they did not do justice to all of man's needs. The current, major world ideologies — fascism, communism, national socialism, democracy, nationalism, etc. — are largely built upon Class (4), the enlarged-ego needs, and evidently give satisfaction to wants that had long been denied under the previ-

ous regime of liberal capitalism. As Tolman [1] suggests, however, the full emotional requirements of mature individuals will only be met by a culture that is oriented about what may be termed " psychological man " or " harmonious man " rather than about a fractional personality. Such a culture, to be achieved one may hope by educational instrumentalities, promises to be more enduring (because more satisfying) than the temporary systems we have hitherto had.

Psychoanalytic theories have familiarized educators with the often unfortunate consequences of repressing id and ego needs, but insufficient recognition has hitherto been given to the equally damaging effects upon personality of frustrating the superego and enlarged-ego demands. The individual can be starved emotionally as much by one form of deprivation as by another. Denying pupils an opportunity to be heroic may seem odd to many teachers, but unless our newest insights are altogether deceptive, this is precisely what happens to a regrettable extent. Younger children and especially adolescents crave opportunity to be loyal to, and exhibit enthusiasm for, an institution, a symbol, and a group. This heightens the significance of their own thinking and doing; and if enduring, it creates an essential basis for the experience of happiness. If loyalty to a congeries of inferior and perhaps ultimately hurtful causes is to be avoided, the educational situation must provide ample occasion to become attached emotionally to more compelling and more valid forms of enterprise.

## SUMMARY

Emotional behavior exists whenever the organism is strongly energized in its reactions and whenever feelings of pleasantness and unpleasantness are prominent. Educationally, the emotions have fared badly because the work of the traditional school has centered

[1] In his address as the retiring president of the Society for the Psychological Study of Social Issues, Sept. 3, 1940, during the meeting of the American Psychological Association at the Pennsylvania State College. See " Psychological Man," Bulletin of the Society for the Psychological Study of Social Issues, [bound with] *Journal of Social Psychology*, 1941, 13, 205–218.

about intellectualistic content; moods and other affective states appeared as distractions or irrelevant burdens. If, however, the happiness of the individual is the prime purpose of all pedagogical effort — and what higher end can rival this? — then the emotions assume a significance they did not have earlier. Whatever betterment of emotional reactions takes place is done with an eye to minimizing unhappiness and maximizing happiness. By this test, fear is seen as an arch foe of pupil well-being and the development of skills, insights, and social regroupings must be undertaken to eliminate so far as feasible all insecurity feelings. Similarly, anger and aggression as a response to the thwarting of any going purpose make more for unhappiness than for happiness when the longer and the larger view is taken; consequently greater pedagogical attention must be given to the substitution of the problem-solving attitude for these maladaptive behaviors. The sex emotion, on the other hand, is positively evaluated for its contribution to the organism's satisfactions; and the building of favorable attitudes and capacities in connection with family and parental functions is a major responsibility of the progressive school. In guiding the course of emotional development, educators must themselves be guided by some conception of the attributes of emotional maturity as these apply to different age levels. Finally, any attempt to improve the affective life of young people requires that they be provided with stimuli that give rise to enthusiastic and "burning" loyalties, for these healthy attachments to ideals and aims represent the culmination of emotional growth.

### PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Is happiness a mental state with which education is typically concerned? Defend your answer by supporting evidence.
2. Describe in a short paragraph your emotions or feelings during the reading of the last chapter. Did this affective undercurrent influence in any way the ease with which you understood the content? Account for what happened in both "subjective" and "objective" terms.
3. What are the underlying reasons for the close relation between

happiness and a state of " mental health "? Are the two concepts synonymous?

4. Is a " dry " course, subject, book, or lecture one that gives the necessary exercise to one's emotions? What are the characteristic differences between those experiences we call " dry " and those termed " stimulating "? Answer these questions not in terms of *reactions* alone, but also in terms of the nature of the *stimuli* presented.
5. Can you point to any new knowledge you have acquired in college which has diminished or banished any of your fears? Any which has created new ones or magnified old fears?
6. Is the concept of " emotional age " (thought of in terms analogous to " mental age ") a useful developmental index? Wherein is it serviceable?
7. If loyalty to some appropriate cause represents the peak of emotional development, what steps could teachers in senior high school take to promote this outcome among their pupils?

# Chapter 9

## IMPROVING THINKING AND REASONING

A giant American corporation uses "Think" as the company motto and many big and little placards bearing this word are conspicuously present in all of its offices. By constantly reminding its employees of the importance of this key mental function the firm hopes to combat the ill effects of an uninspiring routine and to encourage every member of the organization to contribute his best to this commercial institution. There is something amusing about this method of achieving a desirable aim; whether successful or not in its apparent purpose, it is symptomatic of a better type of management-worker relation than that represented by placards bearing the words "Believe and Obey."

If an industrial concern with an important international monopoly finds it helpful to its objectives to surround its staff with these mechanical reminders of the value of thought, how much more significant is such an emphasis when applied in the life of the school! The classroom is far from being the only place where children may learn to reason and to improve their thought processes, but unless these functions of the organism are used and stressed here more than elsewhere, it is hard to see how education can be truly educative. The educated person is, among other things, the *thoughtful* person, *i.e.*, one who is equipped to deal reflectively rather than impulsively with life's problems. Fortunately, the ability so to act is an improvable function. In this chapter our purpose will be the examination of the conditions under which the reasoning process is bettered.

## THE HIGHER MENTAL PROCESSES

It may help to define the point of view of this discussion if we begin with the claim that true learning — at least of the kind stressed by the school — is most helpfully interpreted as a form of thinking instead of thinking being considered as a special case of learning. Thinking exhibits the wholeness of an organism's actions more completely than many kinds of empirical learning which are often quite fragmentary. "Thinking" is not a sharply delimited concept in either daily speech or in traditional psychological discourse, but the results of it always imply a greater measure of understanding, relevance, and control than appears in action without prior or accompanying thought. Thoughtless actions are those which take place when the organism's behavior is characterized by some measure of disintegration; on the other hand, when one "thinks," the integration and control of the entire system by its highest regulative functions in the face of a demand for adjustment are most complete. The admonition to "think" commonly conveys an exhortation to let the total self govern after a full survey of the forces involved and not to permit a lower "part" function to govern the reaction. Technically, a person is not thinking whenever a random flow of images passes by his mind's eye — it is only as these are selected and steered by some guiding purpose that they possess a genuine rational function. Thinking is *directed* rather than incidental behavior, and school learning is — or should be — directed by a purpose that is first present in thought form. High-level thinking involves more of a person's present energies and past experiences than low-level thinking; most of what is commonly called learning is really the latter. Whenever one's new acquisitions of knowledge or skill are referred to a *system* or organized body of ideas, thinking occurs; if they are simply acquired as such, *i.e.*, without this systemic reference, they are merely learned or memorized. Such learning is degraded or incomplete thinking.

This conception of thinking as a higher form of learning (*i.e.*, deliberate self-modification) and learning as a lower form of thinking

is not an artificial cognitive hierarchy but corresponds to many important distinctions in pupil behavior. The adjective "higher" does not reflect an arbitrary value judgment of the observer — it rests upon the difference between behavior occurring typically at the top or cortical levels of the nervous system and behavior that may be subcortical. It is now established (although originally denied by Pavlov) that a simple conditioned response can be produced by a creature deprived of its cortex; of course, it is more readily acquired when all of the neural mass is intact. Co-ordination of organic functions is the basic job of all nerve tissue, but the maximum correlation of all time and space experiences unquestionably is the special business of the cortex. Thinking requires this cerebral cortex or it cannot occur. A "higher" thought process is "high" literally in the sense that it depends primarily upon the integrity of these structures at the upper end of the nervous system.

**Empirical basis for special treatment of the higher mental processes.** However, there is another way of distinguishing between the higher and the so-called lower thought processes. Tyler's study on the relation between recall and inferential and applicational behavior indicates that pure memory processes do differ in important respects from those involving transfer to new situations and the ability to make valid judgments from data.[1] Interviews with college students had indicated that over 60 per cent of them believe that their chief duty is to memorize information considered important by their teachers. The prominence given to factual recall in most examinations appears to be largely responsible for this conviction. Facts must be a part of the educative process if for no other reason than that they are an inescapable part of the nature of reality. No facts can rightly be disparaged, although some facts are much more valuable than others. Other things being equal, the more facts a person knows the better. Unhappily, in matters psychological other things are

[1] See Chapter 2 in C. H. Judd's *Education as the Cultivation of the Higher Mental Processes*, New York, 1936. Quoted by permission of The Macmillan Company, publishers.

rarely equal. Facts may be acquired under a certain form of tutelage at the expense of the ability to use them in other than verbal situations or to the disadvantage of one's powers of induction and deduction. The following is a sample item which tests the ability of a student to draw reasonable inferences from data he has not previously encountered:

Mr. Adams taught physics in a certain high school. He thought that good preparation in algebra was extremely desirable for pupils taking physics. In order to find evidence, he compiled the grades made by all his pupils in physics during the past four years and the grades these same pupils made in algebra. A coefficient of correlation of 0.90 was found between the grades. Mr. Adams concluded that difficulties encountered in physics were largely due to poor preparation in algebra.

Place a plus sign (+) in the parenthesis after each statement below which you consider a reasonable inference from the foregoing paragraph.

*a.* The conclusion is certainly valid. ( )

*b.* The coefficient of correlation is not large enough to warrant the conclusion. ( )

*c.* The number of pupils may be too small. ( )

*d.* Relationship may be present which is not linear. ( )

*e.* Some pupils who take algebra do not elect physics. ( )

*f.* The grades in physics may all be higher than those in algebra. ( )

*g.* The fact that a correlation exists is no evidence of the cause of the relationship. ( )

*h.* The conclusion would be valid if the grades are perfectly valid and reliable measures of achievement in these subjects. ( )

This plus a similar measure of applicational skill and one of "pure" information were administered to students in a large number of courses at the Ohio State University in the early 'thirties. The relationship between the three types of tests appears in Table IX.

The correlations, as expected, are all positive; but it is more significant that they cluster around the low end, indicating that the processes are far from identical. Many students develop a high

ability in one function without acquiring equally great facility in the other two. Particularly noteworthy is the consistency of the results in a great variety of courses, indicating that *the general educational problem of developing the power to reason with facts is not solved by concentrating upon the power to absorb facts.* Achieving good

*Table IX. Correlations between Three Different Tests of Specific Course Content Showing the Likeness and Difference among the Three Mental Processes Involved (after Tyler, see footnote 1, page 261)*

| Course | No. of Students | *r* between Test Scores of "Information" and Test Scores Requiring Both Recall and Application of Principles | *r* between "Information" and Scores of Tests Requiring Students to Draw Inferences from New Data | *r* between Test of "Application" and Test of "Inference" |
|---|---|---|---|---|
| Agricultural Engineering | 37 | 0.34 | 0.28 | 0.32 |
| Botany | 485 | 0.41 | 0.34 | 0.36 |
| Botany | 327 | 0.37 | 0.33 | 0.33 |
| Business Organization | 60 | 0.31 | 0.26 | 0.29 |
| Chemistry | 77 | 0.42 | 0.20 | 0.32 |
| Economics | 210 | 0.39 | 0.32 | 0.25 |
| Economics | 287 | 0.36 | 0.27 | 0.24 |
| Geography | 128 | 0.30 | 0.24 | 0.27 |
| History | 473 | 0.22 | 0.29 | 0.26 |
| Home Economics | 73 | 0.35 | 0.31 | 0.30 |
| Home Economics | 62 | 0.28 | 0.26 | 0.28 |
| Social Science | 22 | 0.33 | 0.26 | 0.29 |
| Statistics | 47 | 0.41 | 0.51 | 0.43 |
| Zoology | 684 | 0.39 | 0.34 | 0.37 |
| Zoology | 431 | 0.34 | 0.42 | 0.38 |
| Zoology (U. of Arkansas) | 72 | 0.45 | 0.53 | 0.39 |

recall is only part of the student's job, but both he and his teacher operate in such a fashion that it is commonly construed as the chief objective. The result is that memorization of facts frequently fails to further the development of the admittedly "higher" and culturally more vital mental processes of correct application of principles and

adequate inference. These objectives need their special favoring conditions before they can be reached.

## DEVICES FOR BETTER REASONING

How does one increase skill in applying facts and principles and in making inferences? From a strictly intellectual point of view, this is one of the most important tasks of all education — just how important few teachers and pupils genuinely appreciate or there would be more evidence of success in these directions. If these activities can be made to loom more impressively as major scholastic goals, the first step toward better performance will have been taken. Without the intent to build up the learner's inference-making capacity, development along these lines becomes much more haphazard and inferior than it should be.

A useful concrete method of promoting the ability to make valid inferences of a logical type was proposed about the middle of the eighteenth century by the eminent Swiss mathematician Euler. It seems that he had a Russian princess as pupil who was not a ready learner and her tutor was driven to invent a number of pedagogical devices to simplify his instruction. The famous "Eulerian circles" of formal logic are a means of developing the power of inference on the abstract and general level by giving the problem in which they appear a direct perceptual character. The simplest illustration of this technique is found in the maplike representation of this standard syllogistic form:

All $x$ is $y$;
All $y$ is $z$;
$\therefore$ All $x$ is $z$.

The truth or falsity or indeterminate character of the conclusion often fails to be discerned by those who have not developed facility in seeing whole-part relations. Consequently, if one makes a model or draws a picture which preserves the essential "structure" of the

three propositions, it should be possible to test the correctness of the conclusion (Figure 30).

**Thinking aided by visual models.** Language obviously has a structural quality or internal design which permits one to convert the simple declarative statement "All $x$ is $y$" into a geometrical or topological equivalent, represented by the smaller $x$ ellipse or circle within the larger one or $y$. The fact that all $x$ is $y$ notoriously does not mean that all $y$ is $x$; for this reason, the "domain" of $y$ is drawn somewhat larger than $x$, since we know that it is at least as "big" or inclusive.

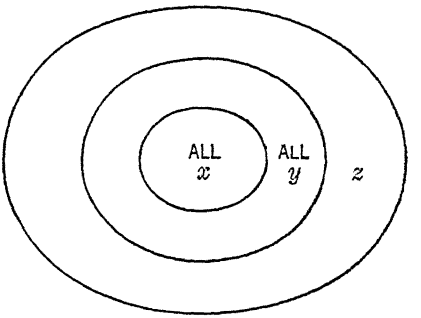



FIGURE 30

Yet all that may properly be inferred from the first proposition alone is that *some* $y$'s are $x$'s. The second statement (all $y$ is $z$) is simply a continuation or expansion of the pattern of the first; hence another circle drawn around the region of $y$ portrays the situation as given. Having done this, all one needs to do to check the conclusion that "all $x$ is $z$" is to observe from the diagram that the field of $x$ lies totally within the field of $z$; the proposition is then "proved" or *seen* to be formally correct. Further one need not — indeed one cannot — go, for human thought cannot be made more exact or precise than this.

The laws of perception and the laws of thinking appear to have a common basis in the way in which they reflect external reality. Thinking seems to be, and probably is, a step further removed from the physical world than "immediate" sensory perception; but as a

mental process it is nonetheless like perceiving in the organization of forces. The fact that, in critical instances, thought can be " reduced " to perception suggests that this structural kinship exists even with the most abstruse thoughts. For example, the syllogism above, which is a bit obscure to many good minds in its verbal *xyz* form is clear enough when the relevant Eulerian circles are drawn as implied in the " directions " expressed by the propositions; and there is no intellectual difficulty usually in following the form when it is clothed in this garb:

All Eskimos are human;
All human beings are mammals;
∴ All Eskimos are mammals.

Most inferences with which we must work in daily life are not as simple as this. From the historical fact that wars in modern times are largely conflicts between national governments and that civil or internal wars are much rarer, we may infer that there is something about the nature of the nation-state which makes armed struggle with other nation-states more likely than a domestic uprising. Inferences of this sort lead to hypotheses which must be tested, for they cannot be accepted as correct on the basis of any formal relationship with existing valid propositions. The entire critical apparatus of scientific method has been developed because the amount of new knowledge made possible by the syllogism alone was too limited.

**Help provided by the principle of similarity.** Thinking is also encouraged by the search for similarities in experience. If our responses were restricted to things in isolation instead of extending to their connectedness and " togetherness," our life of reason would be much less fruitful than it is. Patterns do not occur in the mental realms alone; they also occur " out there " in nature, and our ability to recognize them is one of the most important properties of our organisms.

A historically impressive and clear instance of the power of simple resemblances to lead to significant hypotheses and through them to

important discoveries and inventions appears in a brief memorandum which Benjamin Franklin entered in his experimental notebook under the date of November 7, 1749:

> Electrical fluid agrees with lightning in these particulars. 1. Giving light. 2. Colour of the light. 3. Crooked direction. 4. Swift motion. 5. Being conducted by metals. 6. Crack or noise in exploding. 7. Subsisting in water or ice. 8. Rending bodies it passes through. 9. Destroying animals. 10. Melting metals. 11. Firing inflammable substances. 12. Sulphureous smell. The electric fluid is attracted by points. We do not know whether this property is in lightning. But since they agree in all particulars wherein we can already compare them, is it not probable they agree likewise in this? Let the experiment be made.

From this it was but a step to the brilliant and clean-cut kite experiment by which the kinship of the most awesome phenomenon of the heavens and the curious little prickling sparks of the Leyden jar was established. The history of all the separate sciences is replete with instances of the initial impetus given to great findings by the happy analogy, the apparent similarity, or the structural resemblance of otherwise unlike objects. The possession of a constant mental set sensitizing one to the presence of similarities seems to be one of the surest ways to promote the emergence of a valuable insight.

**Organizing one's mental content.** Another method of developing proficiency in thinking is to provide plenty of opportunity for the classification and grouping of ideas. This may be done according to many different principles, since the excellence of classifications depends upon the purpose they are intended to serve. Convenience is one value, exhaustiveness and orderliness are others. The establishment of a useful classification of plants according to genus-species and order-family relationships was the major scientific achievement of the great botanist Linnaeus; and everyone knows how greatly the advances of chemistry have been aided by the ingenious Mendelyeev table which supplanted less satisfactory ways of grouping the elements. Here the very incompleteness of the grouping was an enor-

mous asset, for the gaps gave a clue to the properties of that which was sought and thereby indicated roughly where a missing substance was to be found.

Roget's *Thesaurus* is a clever example of a simple system of classification applied to the whole range of human thought. Each word in the English language stands for some aspect of an infinitely rich variety of experience; the grouping of these "ideas" into a limited number of categories seems like an impossible task. Yet the six grand headings — (1) abstract relations, (2) space, (3) matter, (4) intellect, (5) volition, (6) affections — probably cover all the things about which man can talk and write. It is interesting that the last three of his grand categories, covering more than half of the total number of entries, are psychological in nature; and many of the concepts listed under the first three heads refer to features of sensation or perception. Other methods of psychologizing the dictionary undoubtedly exist and could profitably be developed.

**Use of "polarity" in thinking.** A further method of increasing the adequacy of reasoning is to make use of the principle of "opposites." Concretely, a student is well advised to maintain in all his reading and listening the "true-false" mental set used in answering a certain type of examination. Every sentence statement in this volume, for example, could be perused with the intention of placing an imaginary "+," "—," or "?" before each "proposition." The units of thought in such instances are often too short to do justice to the ideas which may have to be appraised on a paragraph rather than a sentence basis. Nonetheless, the principle of "polarity" is a useful one to know about because of its very wide range of applicability. To every assertion there is conceptually possible some counter-assertion, *i.e.*, every affirmation may be negated and every negation may be affirmed. Awareness of this grammatical or logical "universal" may often prove helpful in arriving at a true solution to a problem. Thus, the writer on one occasion developed the hypothesis that rats (and other similar organisms) could learn to discriminate between visual objects better if they were placed very near to each

other rather than being kept far apart. He was prepared to find that *either* the greater or the shorter intervals made training easier, but was needlessly disconcerted by discovering that the actual behavior of the animals indicated the presence of an *optimum* distance, *i.e.*, one that was neither too wide nor too narrow. The existence of a third possibility — the classic *tertium quid* — is a necessary corrective for too simple a use of the polar principle.[1] There are circumstances, however, where no real "middle" position exists; attempts to locate such or to defend them then approach absurdity.

**Importance but ambiguity of "realism."** This suggests another important means for the improvement of thinking, *viz.*, intimate dependence upon the fullest realities of experience. The so-called wise man, the person of good judgment, is the individual who reasons in this fashion. Pupils in many of our big cities often know a good deal about the subject matter of local municipal government which is formally correct, but nonetheless creates a misleading impression because of the omission or underweighting of other significant data. To know that a mayor is elected every four years in a certain town is one thing; to know how a political "machine" operates to control votes is another. The "go" of things there is better revealed by the latter than by the former knowledge.

All thinking consequently has a "mental-hygiene" aspect. This is recognized in the adage attributed to Voltaire, that men will commit cruelties as long as they continue to believe absurdities. To refuse to admit certain neglected bits of evidence, to shut one's eyes to solidly attested facts, to trust selected secondary sources rather than primary data — all these are unhealthy acts of the intellect. The outstanding group example of this in recent times has been the favorable reception which many American intellectuals, including some teachers, gave to the Soviet "experiment" during the decade of the 'thirties. These otherwise competent and good persons were de-

[1] See G. W. Hartmann, Learning as a Function of the Spatial Interval between Discriminanda, *Journal of Genetic Psychology*, 1936, 49, 249–253, for fuller details concerning the actual experiment.

ceived by the external trappings in which Communist (really, "Stalinist") activities were disguised. Hidden under a verbal cloak of the finest aspirations of mankind was a vicious and diabolical system of personal exploitation that was literally the bitterest foe of the lofty ideals behind which it lurked. Obviously thinking cannot avoid being led astray when certain crucial factors are not permitted to affect its course. A person often has trouble appraising or meeting an issue because his life history has not provided him with the concrete and direct experiences which would prevent him from being victimized by either an illusion or a delusion.[1]

Unfortunately, the injunction to be "realistic" cannot be conveniently specified in detail merely by recommending that all the pertinent facts about a problem be assembled before an act is done or an opinion formed. There are too many different versions concerning the nature of realistic conduct or attitude in any given instance for this rule to suffice. Realism does not mean that one thinks solely in so-called "practical" terms, *i.e.*, about money matters, personal convenience or comfort, power for one's group, etc.; the most realistic stand under some circumstances may be the most idealistic and self-sacrificing one. Realism in thinking is as much a matter of motive as a matter of method. Occasionally and temporarily it is more restful to deceive oneself, although in the long run such a policy cannot promote good adaptations. If one refuses to admit an unwelcome fact — *e.g.*, that German soldiers are as brave as British or American troops — one is endangering one's future adjustments to the true, as distinguished from a fictitious, world of behavior. Able thinkers have commonly been those who have willingly let their thought processes take them along even to the most unexpected or undesirable of conclusions, whereas others often resist and are less rational than they might be because the uncongenial is considered to be the untrue. The real is falsely identified with the valuable alone, whereas it plainly comprehends that which is of no value or even that which is hurtful.

[1] Several "case histories" of this sort appear in the writer's paper, The Behavior of Communists in Unions, *Ethics*, 1940, 50, 329–335.

Thinking is realistic to the degree that it does justice to all facts and weights and reorganizes them accordingly. This is a severe test. As a technique it is not easily learned or easily taught. Perhaps its chief service lies in pointing to the unrealistic character of all fragmentary thinking, *i.e.*, thought that lacks "wholeness," which does not consider everything that is significant, and which builds a pattern of apperception that is out of harmony with a broader knowledge of things as they are. Realistic thinking is complete in content and systematic in design; pseudorealism commonly mistakes a part of experience for the larger totality that embraces it.

**Flexibility in mental "reconstruction."** Closely allied to thinking of this sort is the procedure of asking, "Could the matter be other than it is?" Loosely, this is the factor of imagination added to the simpler rational activity that is grounded in the existing state of affairs. The operations of thought that are rigid and invariable obviously do not promote effective adaptation as well as those exhibiting flexibility and uninhibited range. A simple illustration from the field of high-school geometry will help elucidate the difference. In the "original" given in Figure 31, the problem is, "Find [or state] the area of the circumscribed square when only the radius of the inscribed circle is known."

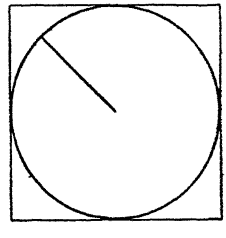


FIGURE 31

Most persons (including even those of considerable educational attainments) are blocked in their efforts to find the solution, largely because they have not established the "habit" of literally seeing things in a variety of ways. It is often necessary to "restructure" a given pattern like the drawing in Figure 31 before an answer is pos-

sible. As long as the reader actually sees the radius as a radius and as nothing else, he is debarred from finding the solution by the inelasticity of his perceptual responses. But as soon as he is able to react dynamically rather than statically to the first drawing, various possibilities begin to present themselves. As soon as the radius is no longer seen as a *radius* alone but also as *one-half of the side* of the square enclosing the circle, the problem is solved for the essential insight has emerged. In other words, effective thinking rests upon a perceptual reconstruction of the sort shown in Figure 32.

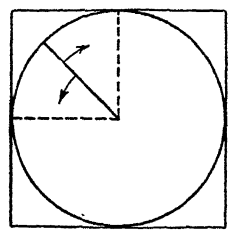


FIGURE 32

The power to visualize or to imagine the stable radius moved into either a horizontal or vertical position is the crux of the successful thought process in this case. All the required relations then "snap together" into the awareness that the area of the circumscribed square is simply twice $r$ multiplied by itself; or, in symbols, $A = (2r)^2$. Keeping the initial situation as it was blocked the solution, but changing it slightly and appropriately led to the correct answer.

There is a world of meaning in this representative observation. It shows clearly the superiority of thinking which begins with such a question as "What is the alternative? Are there other and better ways of doing this?" Such a mental set exerts a liberalizing influence; the learner is either made or kept more plastic by this technique than would otherwise be the case. When things are seen in as many different lights as possible, they literally change their nature. Teachers can facilitate the depth and variety of thinking in their pupils by constantly reminding them to change their perspectives, or better, by showing them the advantages of this procedure in their own

lives. Thus, a 14-year-old urban high-school boy has one approach to the problem of surplus farm products which may be normal for his age and community. His thinking about this issue, however, may be enriched by seeking to develop the positions of the adult farmer, of those who are younger or older than himself, and of others in different walks of life. Knowing how others think about a given question serves to energize and activate one's own thinking. Many a problem has been advanced by *A* stating a thesis, *B* an antithesis, and *C* the appropriate synthesis; but it is plain that *C* could not have done his work without some acquaintance with the how, what, and why of *B*'s and *A*'s reasoning. It is hard to exaggerate the importance of social stimulation in this field; from a motivational standpoint, familiarity with the strength and weakness of other thought productions, *i.e.*, "criticism" in the full sense, is one of the best ways of improving the quality of one's own thinking.

**Mastery of cultural symbols.** Perhaps the outstanding method of bettering thought is that of increasing control and facility in the use of symbols. To a large extent, the higher thought processes are those activities of the organism concerned with symbolic manipulation. A symbol is an object that stands for some other object. Thus, "Atlantic Ocean" is a compact manageable way of referring to that gigantic body of water; "$140" written into a contract is a brief and convenient way of specifying what a teacher's economic reward or purchasing power on the basis of a month's service will be; "$\pi = 3.1416$" indicates a constant relation between the diameter and circumference of a circle regardless of absolute magnitude. Taken literally, "everything" means "every thing," *i.e.*, ships, kings, sealing wax, etc., although the scope of application is usually limited by the context in which it appears.

Symbols of educational significance are of two main types: words and numbers. Both are a form of "language," *i.e.*, a means of communication; historically and psychologically, word symbols are more primitive than number symbols, for the latter are all ultimately reducible to word form. Any mathematical equation can be read out

loud or clumsily written in full (thereby depriving one of its advantages as a species of shorthand). Although all symbols may share these attributes, certain symbols are primarily esthetic and emotional concentrates of a widely diffused body of experiences; the Cross (†) and the national flag sum up in themselves a complex group of personal and institutional practices that are powerful despite their inexactitude. In general, symbols are concrete manifestations of some abstract or larger concrete entity. Usually they help one's thinking, but there are important occasions when they may hinder it. Language notoriously may serve to conceal rather than to reveal thought, and many of the symbols of social living embody a propagandist rather than an educative function. To an astonishing degree, civilized behavior rests upon symbols, a fact of which we ought to be constantly reminded by the power of the press and the radio. Indeed, it has been facetiously suggested that since modern technology would be impossible without the calculations permitted by the invention of the symbol o for zero, all our advanced culture is built strictly upon — "nothing"!

Although the importance of symbols of all kinds for our thinking is difficult to exaggerate, it is necessary to emphasize that effective relational thinking demands patterned or coherent symbols and not symbols as such, organized in any haphazard fashion. Their meaning is dependent upon their order and arrangement; different orders produce different meanings. Mark Twain is supposed to have remarked that the dictionary must be a wonderful book because it contained so many words, but that he nevertheless had great difficulty in "getting the hang" of the story! Thinking depends upon the connectedness among mutually referring symbols. This connectedness is also found in the objective or "real" world. Man's thinking reflects, or actually corresponds to, the state of affairs in the physical world, partly because his own mind is a part of that larger Nature and therefore must share some of its essential properties, and partly because the symbols his brain creates are the "structural identities" or "functional equivalents" of natural phenomena in the form of principles.

The mastery of symbols and of the operations to which they may be subjected is one of the surest ways of increasing the level of a person's thinking, provided that formalism is avoided in the learning process and provided the thinking always returns to the concrete themes with which it begins. An indirect way of showing the difference between "organic" and "atomic" symbolic thinking is found in the table comparing the distribution of parts of speech in an unabridged dictionary and in a general textbook concerned with a broad field of knowledge. The language of ordinary use is clearly different from the dissected word load of the dictionary, if for no other reason than that words recur in connected discourse on some topic whereas in the dictionary they appear but once as main entries (Table X). Note that nouns and adjectives (*i.e.* substantive forms) together comprise about 85 per cent of the separate terms in the English language, but

*Table X. Differences in Proportionate Frequency of Parts of Speech in a Sampling from Webster's* New International Dictionary *and from* Everyday Problems in Science *(after Judd)* *

| Parts of Speech | Dictionary (No Words Repeated) | | Textbook (Including Repetitions) | |
|---|---|---|---|---|
| | Number | Per Cent | Number | Per Cent |
| Nouns ..... | 33,985 | 59.0 | 426 | 24.6 |
| Adjectives..... | 15,033 | 26.1 | 434 | 25.1 |
| Verbs..... | 5,510 | 9.6 | 310 | 17.9 |
| Adverbs..... | 2,758 | 4.8 | 114 | 6.6 |
| Interjections..... | 119 | 0.2 | 0 | 0.0 |
| Prepositions..... | 70 | 0.1 | 207 | 12.0 |
| Pronouns.. ..... | 52 | 0.1 | 101 | 5.8 |
| Conjunctions.... | 41 | 0.1 | 139 | 8.0 |
| TOTAL..... | 57,568 | 100.0 | 1,731 | 100.0 |

* *Cf* pp. 23 and 25 of C. H. Judd, *Education as Cultivation of the Higher Mental Processes*, New York, 1936. Used by permission of The Macmillan Company, publishers.

that in ordinary writing these are reduced by about one half, while the remaining parts of speech (*i.e.* transitive forms) noticeably increase. The enormous difference in the frequency of prepositions in the two columns shows how dependent normal discourse is upon words that symbolize special relationships.

The improvement of thinking made possible by the number system is almost as great as that initiated by the development of language — indeed, number is basically an extension and refinement of linguistic symbols in the direction of maximum precision and generalization. Words like "big," "little," "many," and "few" indicate the origin of the quantitative concepts in rough distinctions of mass or amount. Arithmetic and algebra are chiefly further differentiations of these notions made with tools that can be even more readily manipulated than words. A phrase like "seven peaches" is a condensed and handy way of talking about, *i.e.*, a symbol for, a certain number of edible objects which would take too long to show or to draw; but "7" in turn is a further reduction in the direction of maximum compactness of the term "seven." It is important educationally to stress this continuity and kinship between ordinary language and elementary mathematics, for all too many otherwise good learners fail to see the conceptual unity that ties these fields together and needlessly handicap their skill in thinking by limiting themselves to nonquantitative symbols.

Just as the sentence is richer psychologically than any word or the separate parts of speech, so an individual number finds its fullest meaning not when it is considered as an "absolute," but only by stressing its place in the larger number "system" in which it is a "point." Every learner's thinking is greatly strengthened as soon as he discerns that each number has properties which link it in a necessary and fascinating way to all other numbers. Merely noting that a number is helpfully considered as a "position" and not just as an abstract "quantity" preserves its relational indices which define its innermost nature. Thus, 365 is not just 365; it lies somewhere between 350 and 400, but nearer the former than the latter; it is an odd number; it is exactly divisible by 5; it is associated with such a natural fact as the number of days in a solar year; etc. All these things confer "individuality" upon this particular number and make it much more serviceable to our thought processes. It is as though a pupil identified a new classmate as the cousin of one of his favorite playmates —

the stranger then ceases to be such and is assimilated within the "circle" of acquaintances. In either case, adjustment rises to better levels.

**Language facilitates thinking, but is not to be identified with it.** It must be clear from these paragraphs that thinking and the acts of speaking and writing are closely related processes. Anything that improves a person's command of language, no matter what the mode of expression, does in some way contribute to an improvement in the quality of reasoning he exhibits. Some psychologists have even insisted that reading (= the art of extracting meaning from certain symbols) is essentially an act of reasoning. To this there can be no objection since reading as an "input" act and symbolic expression through voice or pen as "output" obviously require similar powers of organizing experiences or there could be no communication between minds. It is, however, necessary that we reject the absolute identification of the internal act of reasoning with its vocomotor forms of expression — such a theory is contrary to observed facts and produces nothing but confusion where clarity is of major importance. The problem-solving ability of many animals overlaps that of man in his low-grade moments, yet they lack all true symbolic means of communication. Thinking is enormously aided by symbols, but symbol usage is not coextensive with all thought. After all, symbols are an invention of thinking man and that thinking which was good enough to create the instruments by which it can function more efficiently could not have been of a very low level itself. Moreover, some important areas of human cerebration lead to effective adjustments with a minimum of symbolic behavior, if not with a complete absence of it. Many a mechanical difficulty is thus solved in terms of direct nonverbal perception: The individual sees that two wires are separated when they should be joined, he hears the rattle made by a shaft that needs tightening or straightening, he feels the worn inner surface of the nut revealing that the thread is "gone," etc. Symbols may assist without being vital to the consummation of many adaptive reactions involving inanimate structures. Similarly, many "human"

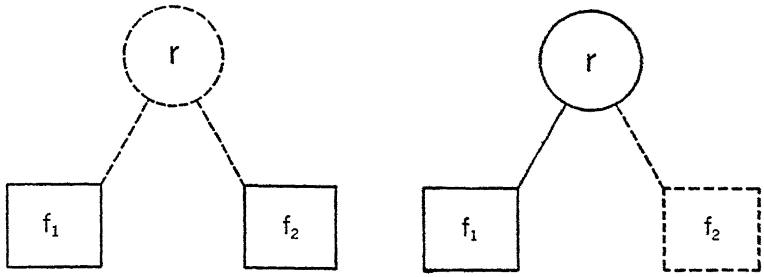
or personal or social situations may be, and are, effectively regulated with a minimum of verbalization and articulation. The insights that underlie all rational activity are not slaves to our language processes; it is more correct to say that these latter are the instruments by which the former are transferred or made known to others. Symbols represent thought, but they are not the same as thought itself. The products of the organism are not the organism. A confusion of two different, albeit intimately related things, is never justified, but is particularly regrettable when the tools and instruments of the living system are equated with that system in action. Language and thought are as different as creature and creator, and nothing but an unsound pedagogy would confuse the two.

## SPEARMAN'S PRINCIPLES OF EDUCTION

Outstanding among the many ways of improving thinking is the method of making the thought processes themselves a matter of "thoughtful" inquiry. To a large degree, that is the faith animating the discussion of the topic in this chapter. Reasoning about reasoning seems like an impossible psychological process, but it rests upon as solid an empirical footing as anything else in human experience. To become self-conscious about one's rational functions is not a handicap — it is a means of sensitizing the individual to the way his mind works and thereby increasing his opportunity to control the details of its operations.

An excellent example of this road to betterment appears in Spearman's famous principle of "eduction." His view is that all thinking begins with certain "fundaments," otherwise known as the "given" or "data." But cognition does not end there; merely to respond directly to sense experience and to know that one is so responding involves very little positive work on the part of the self. This distinctive function of the organism requires one to go beyond that which is directly presented — to complete or to "fill in" the given by inference so that more of meaning emerges and a broader purpose than simple reaction is achieved. The two processes by which this is done are called (1) the "eduction of relations" and (2) the "eduction

of correlates." Spearman formulates the first principle of mental action in this wise: *The mentally presenting of any two or more characters (simple or complex) tends to evoke immediately a knowing of relation between them.* The companion principle is stated in this fashion: *The presenting of any relation tends to evoke immediately a knowing of the correlative character.* Even more important than the two verbal formulations are the basic visual models originated by Spearman to illuminate his ideas:




(1) Schema for the Eduction of Relations

(2) Schema for the Eduction of Correlates

FIGURE 33

In both cases the solid lines symbolize those elements with which a cycle of thinking begins and the dotted lines those factors to be supplied by the cortical activity of the subject. The first principle may be simply illustrated by the presentation of two distinguishable "fundaments" such as the words (or ideas) of "high" and "low." The relation to be found or specified, arising out of the thinker's objective at the moment, leads to such events as culminate in the label or notion of "opposites." In the second principle, the situation is modified by the initial presence of one fundament and a particular relation with the corresponding fundament to be found; thus, if "high" and "opposites" are the stimuli to thought, the triad is completed by the appearance of "low." In both instances, the two things that are given determine the third that is implied by them.[1]

While it is a bit hard to accept Spearman's bold and pretentious

[1] See pp. 63 and 91 of Charles Spearman's, *The Nature of Intelligence and the Principles of Cognition*, London, Macmillan & Company, Ltd., 1927; and his *Abilities of Man*, New York, The Macmillan Company, 1927, pp. 166–167.

claim that these forms of eduction " make up absolutely all the cognition (other than purely reproductive) of which the human mind is ever in any circumstances capable," we may nevertheless profitably use it in the practical enterprise of bettering the quality of our thinking. Some psychologists have rejected Spearman's conception as more logical than psychological, but that is an ethnocentric type of objection for which we have no sympathy. If applied logic leads to more effective reasoning than applied psychology, so much the worse for psychology. The important thing is that man and his education be served and not that the vain glory of a special discipline be enhanced. The real limitation of the eduction pattern is that it seems to fit best certain narrow test situations and an equally confined type of dialectic. Much valuable thinking occurs outside these clean-cut molds which represent a certain kind of expert formalized reasoning rather than the full variety of actual thought.

However, thought " models " of all kinds have their uses in providing the learner with a norm to which his own thinking may be referred. The structural simplicity of these models cannot be invariably reproduced in all reasoning situations, but they may hover in the background and help maintain standards of clarity and coherence. *All* thinking has some sort of design, *i.e.*, it is patterned; and while some designs are undeniably neater and prettier than others, no thinking can be done without occurring within some framework or producing its own frame as it proceeds. The learner is well advised to employ points, lines, and rings to help him in his thinking, for these apparently trivial sketches are authentic representations of the essential " architectonics " of mind itself.

## STRENGTH AND WEAKNESS OF EXISTING PRACTICES

Despite the all but unanimous assent that teachers and pupils both give to the desirability of increasing every learner's reasoning capacity, most tests of this function yield results that are far from flattering either to the school population or to those in charge of their development. Secondary-school instruction has as one of its main objectives the establishment of the capacity to think " scientifically,"

which simply means to think well regardless of the area or content and not just in a manner appropriate to a limited domain called "science." The larger complex called scientific thinking has been separated by Downing into fifteen divisions, each of which has its corresponding subtest, as follows:

(72%) 1. Observation — ability to see similarities and differences.
(14%) 2. Analysis — ability to select elements in a complex.
(48%) 3. Synthesis — ability to put together parts of the whole.
(31%) 4. Selective recall — ability to remember and make proper use of well-known situations.
(38%) 5. Imagination — ability to suggest a number of hypotheses to fit a given problematic situation.
(15%) 6. Suspended judgment — ability to see essential relationships and to detect absurdities.
(35%) 7. Draw conclusions — ability to hold in mind a complex of relations and draw conclusions from them.
(20%) 8. Association — ability to discover essential relationships.
(31%) 9. Adequacy — ability to recognize the inadequacy of data.
(90%) 10. Sensing problem — ability to recognize and define a problem.
(15%) 11. Prejudice — ability to withhold prejudices.
(47%) 12. Selection — ability to select elements based on a statement of relationship.
(48%) 13. Verification — ability to collect facts to test a hypothesis.
( 8%) 14. Reasoning — ability to see the danger in reasoning by analogy.
(41%) 15. Arrangement — ability to arrange data in orderly, logical sequence.

The percentage figures placed before each of the test divisions listed are the midfigures secured from two separate studies: one survey by Strauss of the percentage of 1,343 pupils in grades 8 to 12 who made no errors on these "elements" of scientific thinking, and a similar study by Schuchardt using 1,249 pupils in grades 9, 11, and 12 only.[1] The two investigations agree remarkably closely in showing

[1] Derived by combining the data in the Table given in Chap. 7, of Judd's *Education as the Cultivation of the Higher Mental Processes*, New York, 1936. Used by permission of The Macmillan Company, publishers.

that secondary students have been equipped to recognize problems and to observe effectively, but that they are conspicuously weak in the still higher mental processes of reasoning, analysis, and induction. A certain unevenness of performance is always to be expected and measures of thought capacity are almost indistinguishable from tests of abstract intelligence; nonetheless it is quite clear that schools so far have been successful only in the early stages of the thought cycle and that the completion of the problem-solving sequence demands more attention to the reduction of prejudice, the accuracy of judgment or inference, and the production of fruitful insights. A full, systematic treatment of any great issue is certain to involve these processes. The evidence indicates that science teaching (broadly construed) is fairly effective in the preliminary phases of thinking about a question, but that there is a noticeable failure to "carry through" in well-rounded fashion. The extended reasoning configuration is left unclosed, perhaps because standards of thoroughness are not well developed.

Another explanation, however, may be found in the character of the documentary stimulation to which the pupils are exposed. Science textbooks themselves, for some strange reason, are largely concerned with "telling" rather than critical reflection upon what is being presented. McCallister[1] analyzed 100 pages of each of 20 excellent high-school textbooks in the natural sciences and found that the average percentage of emphasis given to each of four major intellectual categories ran as follows:

Assimilation and retention of information, 68.2 per cent.
Apprehension of relationships, 13.0 per cent.
Development of concepts, 13.0 per cent.
Solution of questions or problems, 5.8 per cent.

Such a situation implies that the representative science text is largely devoted to getting students ready to think without providing sufficient opportunity for the full-blown act of thought itself to occur. The informational phase of science instruction is indispensable, but it is

[1] *Cf.* Chapter 6 of Judd's *Education as Cultivation of the Higher Mental Processes.* Quoted by permission of The Macmillan Company, publishers.

doubtful if fully two thirds of pedagogical effort should be devoted to this when the core of human thinking is found in other and more distinctive psychological processes.

## SUMMARY

Thinking and reasoning have been used as synonyms in this chapter to designate all those intellectual processes by which the human being accommodates himself to the world of ideas. The betterment of our conceptual and symbolic behavior requires first of all an awareness of the differences between information as such and the application thereof or the inferences derived from it. Too much school achievement is centered on the preliminary stages of rational activity — the raw materials of the intellectual life — and relatively too little upon the upper levels of systematic reflection. To bring the student to the plane where his higher thought processes are efficiently employed, teachers may make use of a great variety of methods, of which the following are representative but not exhaustive:

1. The reduction of abstract relations to direct perception.
2. The constant search for similarities and differences among experiences.
3. The exercise of the ability to classify and categorize a large and heterogeneous body of material.
4. The maintenance of a mental set that preserves or increases sensitivity to a variety of possibilities, no matter how unpleasant.
5. The development of realism as a quality of one's thought content.
6. The development of facility in employing word, number, and other symbols.
7. The mastery of the eduction process as outlined by Spearman.
8. The use of models and schematic "pictures" for the sake of a better anchorage to the reasoning sequence.
9. The apprehension of the way in which things are organized in a certain configuration as a prerequisite to the understanding of the details.
10. The arousal of interest in the "machinery" of thinking as it appears in oneself and in others.

Although there is a vast amount of variation in the way in which superior thinkers carry on their reasoning functions, the nature of the human mind is such that the poor or immature thinker cannot fail to move somewhat in their direction by the diligent utilization of the ten devices listed above. The royal road to excellence (or at any rate, improvement) in the process of thinking is to be found in the cumulation of the small advantages conferred by each additional technique that is mastered.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. What are the normal conditions or stimuli that give rise to thought?
2. Have some person, as near like yourself as you can secure, tell in detail what mental processes he is able to detect during the course of *understanding* this sentence: "No other experience of the mind gives anything like the sense of absolute intellectual arrest from the loss of a mental fulcrum, a starting point of thought, which comes during a momentary obscuration of the sense of one's identity" (Bellamy).
3. What differences, if any, do you see between the thought processes of a first-grader and an educated adult? Do they solve their respective problems in essentially the same way? Describe.
4. Are teaching for information and teaching for inference and application contradictory or supplementary activities? Why?
5. If all thinking proceeds in accordance with some structure that characterizes it, does this mean that that structure is always known to the thinker?
6. What special advantages and disadvantages do you see in the view, outlined in this chapter, that thinking is a special form of indirect perception?
7. State some types of reasoning which in your judgment do not follow any of Spearman's eduction patterns.
8. What common tests can one apply to determine whether one's own thinking or that of one's neighbor has been thoroughly realistic?

# Chapter 10

## INCREASING THE EFFICIENCY OF LEARNING

No topic in educational psychology is more extensive than that designated by the blanket term "learning." This word and the numerous natural processes to which it refers cover such a variety of phenomena that one could reasonably claim to include about 90 per cent of all general psychology under this head. From a certain point of view, psychology or the science of behavior itself is practically equivalent to a study of learning. Modifiability is an attribute of every function of the living system. If the individual were a changeless creature, no problems of learning would arise; it is only because change, as Heraclitus saw long ago, is one of the most basic characteristics of the organic universe that learning as a special kind of change becomes possible. Schools exist to make certain preferred types of change or learnings occur faster and better than would be the case without them. Teachers likewise exist *qua* teachers in order to ensure that learning is accomplished in the light of recognized social standards and considerations; and pupils themselves are supported in their student role in order that definite changes in them may develop. No matter how it is looked at, the educative process without learning is unintelligible and literally impossible.

### THE ADAPTIVE PROCESS

Learning is commonly deemed to be restricted to living things.[1] The higher and more complex the organism, the more things it can learn to do. It is frequently asserted that the results of all learning

[1] Many substances after being treated in some way retain the effects of this change and do not return to their original premodification state. Have they "learned"? A sheet of paper retains the folds in which it has been bent. Many physicochemical changes are said to be "irreversible." There are many puzzles

adapt or adjust (the two verbs are used synonymously) the animal to his environment. This is not strictly true. Some learning definitely injures the organism's chances for survival and these ill effects can only be corrected by more and better learning. Children learn hurtful as well as helpful habits, a fact which prevents one from considering all learning beneficial, although it is probably more often that than harmful. Psychologists may study modifiability without troubling to evaluate the content of that which is subject to modification, but educators necessarily are concerned with the differences in merit of the things learned. The curriculum problem, *viz.*, what is worth learning, begins with the first adaptation that comes into view.

Broadly speaking, learning is any method whereby an animal increases its mastery of experience. By it the creature is aided to live or to live better. Through learning added control over the course of events may be achieved. The circumstances of life are constantly altering and sheer survival often depends upon the ability of the organism to adjust its behavior to new conditions. In extreme situations, adapt or perish, learn or die — such are the alternatives which provide strong motives for making all possible efforts to achieve effective adjustments. Of course, not all learning occurs under conditions of such peculiar urgency, but an accumulation of failures to learn may lead to eventual destruction. In a very real sense, life is preserved and fostered by learning, and any learning that does not maintain this essential biological function is condemned to futility.

The adaptations that are required for successful living vary with time and space. These adjustments assume many different forms, but they always represent the price of existence, or at least desirable existence, in the kind of world in which men carry on their activities. It may mean learning how to use a bow and arrow in one era, how to add and subtract in another, and how to conduct a discussion group in

here, but it probably is best not to speak of these phenomena as "learning." The facts of hysteresis, however, strongly suggest that true organic learning and these inorganic changes in substances and properties are not unrelated. The speculative possibilities here are exceptionally enticing. The reader is urged to elaborate some of his own as a useful exercise in scientific imagination.

another. Some of these adaptations are fairly constant over long historical periods, but others change swiftly with every minor transformation in the physical and cultural environment.

Man has at his disposal but two ways of meeting the problems that the sheer process of living inevitably creates for him — he can either yield to the force of circumstances and modify his own behavior along submissive lines or he can actively impose his own desires upon the outside world by appropriately reconstituting it. Whichever type of adaptation he selects involves extensive learning, regardless of whether the modification is localized primarily in himself or chiefly in the situation. Our power to manipulate the physical, social, and personal forces that so deeply affect our welfare has grown enormously in recent centuries, but it is still hardly more than a beginning; in addition, our physiological and mental weaknesses compel all sorts of bowing to necessity. No matter which option is chosen, corresponding changes in skill, knowledge, and attitude must transpire, or the arrangement is unsatisfactory.

The important insight to establish at this point is that learning is coextensive with life itself. This is not an ephemeral pedagogical slogan — it is simple, literal truth. Where there is life, there is learning. The frequent association of "learning" with school learning makes even thoughtful educators forget sometimes that learning is as natural a process as breathing, digesting, or sleeping. None of these processes are peculiar to the human species. We may profitably be reminded, too, that learning would go on even if schools, teachers, and students were not about; the materials of learning, to be sure, might differ, but as a neural process it necessarily occurs wherever behavior is found. The *processes* involved in any act of learning are, as we shall see, matters of grave disagreement among investigators, but there is much less discordance concerning its results or effects. As Katona says,[1]

[1] George Katona, *Organizing and Memorizing* — Studies in the Psychology of Learning and Teaching, New York, Columbia University Press, 1940, p. 3. Quoted by publisher's permission.

If a performance is better than a previous performance — that it is merely different is not sufficient — and if, moreover, the improvement is due to the effects of the previous process, then we call the previous process " learning."

## SOME LEARNING EXPERIMENTS

Before an educational worker can be said to " know his way about " in the field of human learning, he must know something about the vast body of experimental researches now available in this area. The course of modification of behavior has been studied with almost every known living species, with every major function, and under an extraordinary variety of conditions. Someone, referring facetiously to the many analyses of motor skills, has declared that everything that could possibly be thrown has been thrown and whatever lent itself to being caught has been caught. Of course, this is not literally the case, but it suggests that some acquaintance with the details of a few representative studies is a prerequisite to a proper interpretation of the recommendations for teachers which psychologists make on the basis of these researches.

Let us begin with a simple little procedure developed by Katona that anyone can manage. Type or print on a card the following numbers:

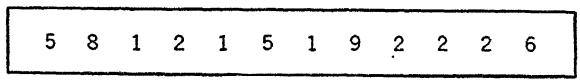



FIGURE 34

Now show this card to three different groups of subjects with five or more persons in each group, using a slightly different approach in each case as follows:

Group 1 is told to learn the series by grouping the digits in triads, thus 581, 215, etc.

Group 2 is told orally " The Federal expenditures in the last year amounted to $ . . . ," the experimenter pointing to the numbers as

he reads " five billion, eight hundred and twelve million, one hundred and fifty-one thousand, nine hundred and twenty-two dollars, and twenty-six cents," and directing the audience to memorize this sum.

Group 3 is told to discover the principle or regularity imbedded in this series of digits as an aid to later recall. The order that is most pronounced appears in this schema:

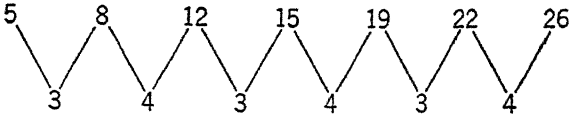



FIGURE 35

This " ascending " design is not easily discerned by most subjects, but those who do see the smoothly alternating pattern of difference shown by the numbers in the lower horizontal row experience a quasi-esthetic feeling when this is made clear.

Certain very interesting differences in recall appear if these same subjects are asked one week later to reproduce the numbers previously learned. The members of Group 1 are usually unable to give correctly the order of the numbers as they appeared on the card, although they may reinstate a few digits or groupings. Group 2 rarely knows the *exact* amount of the national budget to the penny, but it will remember that the total was slightly under six billions; this " rounding out " activity apparently simplifies the process of retention. Group 3 will have the largest number of " successes "; having grasped the nature of the numerical organization and systematized its internal relations, they experience the least difficulty in offering it again when called for.

This " parlor " experiment lacks certain niceties of methodology but is distinctly illuminating with respect to many significant pedagogical problems. Group 1 was asked to participate in a task considerably lower in the scale of meaning than that enjoyed by Group 2 or 3; a relative impermanence of learning appears to be the outcome of a mere exercise in bunching numbers. Group 2 has little trouble in

retaining the *substance* of its original learning — it got the "general idea," but fell short of high precision. Group 3, from the viewpoint of gestalt theory, is the most interesting of all: The finding of a principle embracing the entire subject matter has ensured a more exact retention with greater certainty of reproduction and with little or no initial repetition. A knowledge of the key to the whole enabled the separate parts of the series to fall naturally into their proper place.

Educationally, the significant thing about Katona's experiment is that it shows plainly that different methods of learning as used by the "pupil" and engineered by the "stage setting" of the teacher do bring about sharply different results even when the time required is much the same. Noteworthy too is the fact that in all three cases there was no learning without grouping, although the grouping was of different kinds or "levels." In other words, grouping of some sort is necessary if serial data are to be assimilated, but not all grouping is equally effective. The hypothesis that that kind of learning which consists of understanding organized wholes is the most complete and useful receives considerable support from these observations.

**Thorndike's demonstration of "belongingness."** Another elementary demonstration of the existence of a major factor governing the acquisition of responses appears in the following minor "stunt." Read once or oftener to any attentive audience in an even and monotonous tone of voice these sentences (or any constructed like them):

Eleanor and her sister are young.
Frederick and his brother were working.
Jones and Smith have recently retired.
Amy and Charles will be married.

Now ask the subjects to write their answers to such questions as these:

1. What word came after "were"?
2. What word came before "have"?
3. What word came before "sister"?
4. What word came after "Charles"?

5. What word came after " retired "?
6. What word came before " Frederick "? Etc.

A record should be made of the differences in the number of right and wrong answers (including omissions) between (*a*) those responses made to items that occur within the same sentence, as in (1) to (4), (*b*) those which refer to the first word in the next sentence or the last in the preceding one, as in (5) and (6). While there is considerable variation among all the items in the number of right replies, it is customary for correct responses to occur much less frequently in the (*b*) category than in the (*a*) type. The reader should test this for himself since the point involved is too important to be accepted on faith. Apparently the coherence among the items belonging to the same sentence structure is closer and results in a high degree of interdependence among the separate parts, so that when any one term is given, its " neighbors " can be reinstated. This dynamic intimacy apparently is much less when the cross reference is to words falling within different systems; the spatiotemporal interval is the same, but the psychological gap is much greater. The " belongingness " factor appears to be an expression of the tightness with which some details are integrated into a given structure and the comparative looseness of their connection with other items equally " near " in a strictly formal or mechanical sense. Schematically, the four sample sentences behave as shown in Figure 36. In this patterning, *a*, *b*,

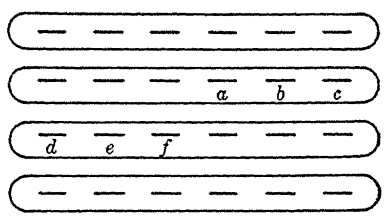



FIGURE 36

and *c* and *d*, *e*, and *f* have each as a group more inner ties to each other than *c* and *d* have to each other. The ease with which we

learn different content or material is noticeably influenced by the specific organization of that which is learned.[1]

**Rote and logical memory.** It is also helpful in building up a background of ideas about the learning process to administer the following four lists to one or more subjects, or better, for oneself to serve as an experimental subject. A comparison of one's behavior in acquiring and retaining these different series of 12 "pieces" should prove enlightening concerning the value of unitary apprehension as a means of facilitating superior performance.

| *List A* | *List B* | *List C* | *List D* |
|---|---|---|---|
| zeb | sky | book | Jefferson |
| mij | pen | cover | early |
| kaf | girl | chapter | opposed |
| tig | was | page | every |
| lev | key | title | form |
| dup | far | author | of |
| han | may | publisher | tyranny |
| jex | who | preface | over |
| nol | knee | reference | man's |
| wuk | spin | heading | mind |
| gis | roll | footnote | and |
| yod | stay | index | body |

There are some likenesses and some differences in these four lists which it is worth examining. There are 12 items in each and their arrangement is such that they have almost certainly never been seen in exactly this order by anyone before this moment. Analysis of what happens within the learner as he seeks to master these different configurations shows that he has most difficulty and least pleasure with *A* and the least trouble and the most satisfaction with *D*; *B* and *C* occupy an intermediate position. In *A* there is not only more to be learned against resistance, but to most persons there is much less to show for it after one has learned it; in *D*, on the contrary, the transi-

[1] It should be emphasized that this explanation of "belongingness" is not quite the same as that offered by Thorndike in connection with his demonstration of its reality.

tions from one component to the next are made gracefully so that one is not only carried onward but also upward. In *A*, the spatial relationships of sequence are about all that this or any other list of nonsense syllables contains; other mental "stuff," apart from fugitive and bizarre associations, is usually barren and limited in the extreme. In *B*, the separate words are readily perceived without any jar or irritation, but as disconnected words they are made to hang together by such integrating devices as an image of a *girl* with a prominent *pen* in her hand seen against a vivid *sky*, etc. In *C*, the pieces snap together quickly because a single reading suffices to show that they are all characteristics of a printed volume, which provides a concrete and natural unity that is missing in *B*. In *D*, of course, one is dealing with an intelligible "sentence" arrayed vertically; here the unity of what is learned is more than that of an "image" and approaches that of an "idea." The learner usually experiences a sense of reward in having learned "something" which is missing in the other three series. This feeling of having "advanced" in some respect following a learning effort is of paramount importance, for if the subject believes he is "not getting anywhere," his performance is all but certain to be unfavorably affected.

Because of the great value rightly attached to the factor of "meaning" in all learning, it should be stressed that no experience or stimulus is ever meaningless in a strict sense. It may have little meaning, a distorted meaning, or an ugly meaning; but nothing that affects a person and which provokes a reaction from him can be strictly devoid of meaning. The fact that he notices it and does something, however little, about it is behavioristic evidence that he finds *some* meaning therein. A page of shorthand to one unfamiliar with stenography is low in meaning, but to recognize it as shorthand, if that is all that can be done, is nonetheless a significant reaction. Even a nonsense syllable has some meaning to the learner — to identify it correctly as a nonsense syllable is a prerequisite to certain appropriate conduct in connection with it. An experience with absolutely zero meaning is psychologically nonexistent. Rote learning, the curse of all inade-

quate instruction, defines one end of the meaning continuum and logical or "systematic" learning the other end. Relatively, there is less of it in one instance than in the other, but it is positively present all along the line.

**A comparison of insight vs. trial-and-error in problem solving.** If one watches carefully one's own behavior or someone else's during the learning of some complex act, it is possible to distinguish a relatively long preliminary period of mental or physical "fumbling" and a comparatively short critical or turning-point period during which the act is essentially mastered. The first stage is properly designated as the trial-and-error phase, and the second or culminating phase is the moment of insight itself. This distinction is not commonly made in most educational or psychological discussions of the learning situation, but it is central to any mature professional endeavor to better the quality of pupil learning. The student of this problem is therefore urged to repeat on himself and others the kinds of controlled observations now to be described.

Suppose one begins with the angle test depicted in Figure 37. The experimenter tells the subject that each horizontal row of geometrical figures (triangles and other polygons) is to be considered as a unit. The experimenter will do something with the first set which the subject is to repeat by doing the corresponding thing with the rest of the rows. The experimenter then points to the most acute angle in the first figure, the most obtuse in the middle, and the most acute one again in the last — all this while the subject watches intently to see what has been done and why a certain sequence is correct and any others wrong. The subject is directed to point to the correct angles in the later sets; if he cannot do so, the experimenter demonstrates the "principle" again with the second row, requests the subject to try again, and continues the procedure until the subject "catches on" or fails to solve the problem after five demonstrations.

Remember that the scientific interest here is less in the solution as such than in the *method* by which it was achieved. One subject

who saw the "acute-obtuse-acute" sequence as soon as it had been executed on the first triad of figures described the emergence of the idea as "a feeling of indistinct looking followed by something arising." This is the insight phenomenon caught as it were during its very birth. It is as though a new figure had been superimposed upon an old ground. Maturation of this relational function had advanced

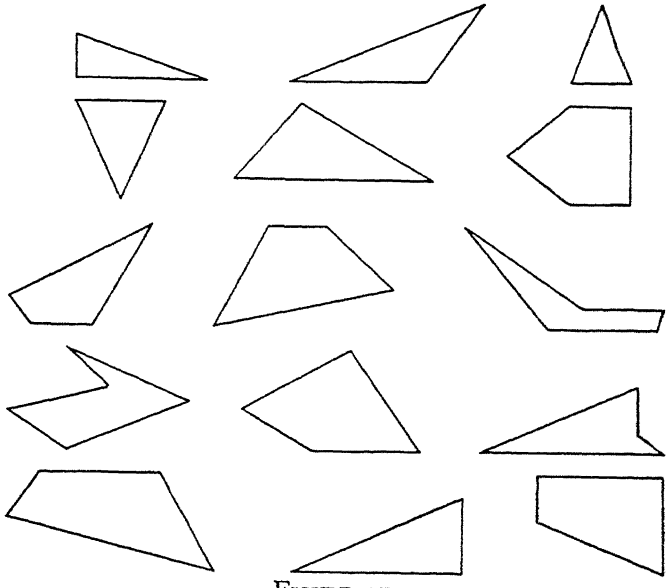


FIGURE 37
Angle test.

sufficiently far with this learner so that on the very first occasion the situation was presented to him, the internal conditions were such that the right "combination" or closure could be formed. Another subject, however, was unable to achieve the correct solution even though the following separate suggestions were offered and tried: (1) The absolute magnitudes of the initial illustration were to be reproduced in all later rows. (2) All three angles touched must together add up to 180°. (3) The correct angles were opposite the largest sides. These are all high-grade rational possibilities, all potential "principles" in themselves, and intrinsically as good as the real

insight but for their objective failure to fit the total reality. Because these suggestions proved to be "false" insights, functionally they were mere "trials and errors," *i.e.*, tentative organizations that preceded the formation of the successful one.

This view of the role of "trial-and-error" as occurring only when the required insight is deferred is a matter of major importance to both the theory and the practice of learning. The long prevailing view that all learning is essentially a matter of attempting or doing one thing after another in more or less random fashion is popular and plausible but utterly false. Such behavior may be approximated when an organism is placed in a situation where his nature and training are such that he is utterly at a loss how to proceed. Trial-and-error, in the descriptive sense, is consequently at its greatest when the gap between the creature's potentialities and the demands of the situation is also widest. But usually some dim insight, however feeble, is called into being to direct the search for a better adjustment. The cat in the famous puzzle box, devoid of all knowledge of human levers, buttons, and similar contrivances, does not attempt to escape by running systematically throughout his entire behavior repertoire in the hope that some one of these will get him out. Instead he seems to rule out from the start many possibilities of response which are never once called into action and concentrates upon such reactions as seem to fit the predicament in which he finds himself. It is as though a certain area were staked off as promising from other regions considered unpromising before further detailed variations were undertaken. There is a marked difference between irrational "hopping around" and rational "tapping around."

Another test of the same general type as the angle-pointing test mentioned before may be used to clinch the issue. This time the subject is confronted with two sample "inverted analogies," although at first he may be unaware that this is what they are. Thus,

steel:hard :: burden:*light*

stomach:middle :: head:*bottom*

Obviously the fourth term in the "proportion" is obtained by first

finding the normally expected analogue and then giving its opposite. The precise instructions to be used are these:

The underlined words in the first two model sentences are deemed correct because no other words satisfy the principle implicit here. Analyze the examples for the rule and apply it to the remaining items.

If the point is not soon seen, added helps are given by cumulating, one by one, the right answers for the test series:

one:two :: today: _____
egg:oval :: sun: _____
pot:cook :: broom: _____
Socrates:wise :: Hercules: _____
acid:sour :: honey: _____
lamp:stove :: flame: _____
eat:hungry :: sleep: _____
feathers:light :: diamond: _____
mouth:hand :: eat: _____

As before, the introspections or self-analyses of the subject cast much light upon the actual learning mechanism involved. One subject declared: "The correct idea arose after the experimenter said 'square' in connection with the word 'sun' following my failure to give the logical response. The right answer here was sharply pictorial and I saw the point vividly and instantaneously." After a few initial errors, another said: "Something happened within me resembling the electric light bulb which the comic papers place over the stupid fellow's head." Another expressed his experience somewhat differently: "It was as though one were going in swimming and slowly sticking one's feet into the water."

Externally the most significant thing about these situations is that errors abound until the principle of the solution is discerned, after which no further mistakes appear, *i.e.*, 100 per cent failure preceded the critical moment of authentic insight followed by 100 per cent success. The learner's outer and visible conduct seems to undergo something like a right-angle change in direction following the

attainment of the needed reorganization. Before this his tension is high and he behaves a bit like one being frustrated; thereafter he is the skilled and competent craftsman demonstrating his capacity to deal with each case brought before him. The learning work to be done apparently demands first that the isolated data be placed in a larger total system; as soon as this co-ordination of relations is arranged, the principle is plain and easily applied to other similar problems.

When trial-and-error is at a minimum, insight may be immediate; when insight is delayed because of the subject's inability to structure the task, trial-and-error is at its maximum. Seen in this light, the two terms are *descriptive* of complementary phenomena. The *causal* explanation of learning, however, can never be given in terms of trial-and-error (or trial-and-success) alone; some form of insight is needed in every case of learning and problem solving. If the trial-and-error activity did not eventuate in some insight, the learning of the performance would be postponed indefinitely. The insight is the successful variant that is selected to survive while the less successful adjustments perish or disappear. The insight in the learning situation is simply the " hypothesis " that has been confirmed by the actual experiment; the rejected hypotheses which are false or inadequate organizations of the same content are also insights from a sheer conceptual standpoint. The insight theory of learning merely declares that every learned performance rests upon some principle (form, gestalt, pattern, configuration, organization, total, etc.), *i.e.*, a new whole produced by the appropriate integration or closure of the component parts.[1] The " moral " of this for teaching is plain: Aim constantly at the production of insights, for without them there is no understanding, and without understanding there is no true learning.

**Limitations and values of learning researches.** The professional student of the learning and teaching process as it occurs within the

[1] For more problems and examples, most of which lend themselves readily to self- or student experimentation, see the writer's paper, Insight vs. Trial-and-error in the Solution of Problems, *American Journal of Psychology*, 1933, 45, 663–677.

framework of American culture usually rests his recommendations upon the findings of such investigations as have just been outlined. Such an attitude is thoroughly defensible, for it is harmonious with the principles of objectivity and the implications of scientific methodology. However, there are certain considerations which it is well to state clearly at this point that must not be neglected in appraising this extensive literature. Here are a few of them:

1. All psychological findings must be interpreted in the light of the procedures and techniques used in obtaining them. If we accept the view that all phenomena are a consequence of the conditions which produce them — and it is hard to see how this can be denied — then the results of learning studies appear as a special instance of this more comprehensive principle. Exactly what did the experimenter and his subjects do? How did the problem under investigation arise and how was it concretely formulated and tested? What motives were operating with all the participants in the inquiry? How were the stimuli applied and the responses registered? Do the data permit of only one explanation? These and many similar questions must be raised before the best meaning can be extracted from these researches.

2. Many of the studies presented in this volume emphasize the end states, *i.e.*, the *before* and *after* phases of individual modification, rather than the learning process itself. Typically, these inquiries report the condition of some function in a person or group on an earlier occasion and then again at a later time; during the interval some critical experience has been effective in altering the behavior of these individuals. There is a noticeable difference between the first and last states. Such information is extremely useful and it is foolish to despise the practical knowledge that it provides, but it does not tell us very much, if anything, about the step-by-step changes that brought about a shift from condition *A* to condition *B*. It tells part of the story, but not all of it.

3. Where laboratory rather than school situations are used, it is worth asking if the differences in the social situation, motivation, etc., are of a quality or magnitude sufficient to make the application of

the results doubtful in a new situation. Two contrasting viewpoints are found. Some educators look askance at every study not executed within a natural school setting and lament the "artificial" character of the learning that is produced under laboratory controls. These experts claim that little guidance is afforded by such data to the teacher or pupil concerned with the learning of different things under apparently different circumstances. Other investigators, however, maintain that most pedagogical problems are too big to be handled in one piece and that they must be reduced to manageable dimensions by the usual laboratory technique of "divide and conquer." Thus, children's memory may be broken down into memory for forms, colors, numbers, faces, names, and other content.

The values of the laboratory technician are not identical with those of the classroom practitioner, but this is no reason why they should be conflicting. Reading in the laboratory is essentially the same psychophysical process as reading in the normal school situation. Where the experimenter identifies and selects problems that are central to the work of the learner, no question of the educational utility of his findings arises. It is only when petty issues are painstakingly elaborated that laboratory studies of learning become of vanishing significance. Some problems are handled best when they are taken to the laboratory and others are most fruitfully developed when they are dealt with elsewhere. Ideally, a study conducted in a laboratory setting should be extended and confirmed by some equivalent school situation and vice versa. In most cases, the difference in performance is less than is commonly assumed.

4. The real objection to the laboratory is not to the laboratory as such but to what goes on there, just as the real objection to "armchair" psychology is not to the armchair but to the quality of the thinking that takes place when the thinker is located in one! The selection of narrow rather than complex mental operations in the search for the most economical methods of learning; the use of adult subjects, usually superior graduate students, instead of school children of various ages; and the use of meaningless or arbitrary tasks in

place of " sensible " performances — such are the common deficiencies of many researches in educational psychology. The frequent use of animals, notably the patient white rat, is likewise condemned. It is well to remind the laboratory investigator that this is how his work is greeted by many schoolmen, but the solution does not lie in the abandonment of his more refined approach; instead, an extension of the learning experiments to deal more widely with these field requirements is indicated. Both types of researches enrich our insight. Neither an antilaboratory bias nor an antipractical mental set can be justified in this field.

Forlano's dissertation offers considerable comfort to the person who maintains that laboratory researches furnish the best guide to schoolroom practice other, of course, than that obtained by specific classroom analyses.[1] His inquiry was specifically directed to the question: Do the results of laboratory experiments in learning hold when approximately similar experiments are tried under schoolroom conditions? He tested in the ordinary city-school classroom (Grades V and VI) these three principles, all of which had first been enunciated under nonschool conditions:

1. Other things being equal, a combination of reading and recitation during the course of the learning process is more effective than mere re-reading throughout the learning period. [This generalization holds for meaningful as well as nonsense material.]
2. Other things being equal, reward in general increases the rate and amount of learning. [Actual monetary rewards were used in the check.]
3. An immediate knowledge of results is more beneficial to learning than a delayed knowledge of results. [This is a corollary of the principle that a knowledge of results increases the rate and amount of learning.]

The first two principles were vigorously and unambiguously confirmed in the concrete elementary situation; the third yielded ambigu-

[1] George Forlano, *School Learning with Various Methods of Practice and Rewards*, New York, Teachers College, Columbia University (Contributions to Education, No. 688), 1936.

ous results, probably because of methodological defects in the planning of the testing situation. It seems likely, therefore, that a systematic classroom check of the most important laboratory findings and recommendations in the field of individual or group learning would tend to confirm and extend most of the insights initially developed on a smaller scale.

## THE IMPROVEMENT OF MOTOR SKILLS

The phrase "motor learning" is customarily reserved for such overt acts as penmanship, typewriting, swimming, and the countless postural and "manual" adjustments that the human body or its members can perform. The motor aspect happens to be most prominent in these types of skill, but it should not be forgotten that the sensory and particularly the central co-ordinating components are absolutely necessary to the discharge of the complete act. One must never disregard the fact that it is the total organism that does the learning and not just those outer mechanisms that are most conspicuously involved.

This assertion can be tested very simply by a few observations. The reader of these lines is probably a right-handed person who has rarely, if ever, signed his name with his left hand. Now take this occasion to write your signature with the left, or nonpreferred, hand. The name will be written more slowly, with less ease, and the attractiveness or legibility is probably less than usual; but it is nonetheless recognizable even though one may never have written the name this way more than two or three times. It is clearly much better as a signature than that produced by the preferred hand after the same number of trials in infancy. This familiar phenomenon of "cross education" or transfer shows that the learning has not remained confined to the exterior points or segments primarily involved but "irradiated" elsewhere — the total central nervous system was concerned with the original learning and was influenced by it. This may be shown still more convincingly by one's ability to write one's name in the sand at the beach using the big toe as a stylus or by trying to write any

word with the elbow or even by attaching a pointer to the head or body as a whole. This curious fact that an identifiable form, or transposable gestalt, can be produced in so many different ways is fairly convincing evidence that each specific skill involves a modification of the entire system and not just of some of the peripheral nerve endings.

In the acquisition of any skill in which muscular co-ordination is a major factor, this role of the complete organism must be remembered and acted upon if efficient learning is to occur. The acquisition of skill in swimming shows this to perfection. The upright posture of man is apparently the prime reason why swimming is not a native or unlearned skill for him as it seems to be for most quadrupeds. Most other land animals make an immediate adjustment upon being thrown into the water, helped, no doubt, by the fact that their posture can be kept much the same as in normal locomotion. In man the mastery of the necessary motor controls in swimming is like a delayed perceptual insight, for it takes some time to grasp the " pattern " of the swimming performance and to translate this into the appropriate sequence of separate movements. It is not enough, as everyone knows who recalls his own first efforts to swim, to breathe correctly, to hold the head and body in the right position, to kick properly, and to swing the arms in the desired fashion, if all these things are done without reference of one to the other. These things must all be assembled into a working unit before the skill of swimming as a configured action really exists. The integration of these partial responses into a higher order act which depends upon each of them but which none of them alone can bring about is the descriptive essence of every skill known to man.

**Evidence of motor insight.** The insight phenomenon also appears in every form of motor learning even though it is often disguised and less obtrusive than in other types of learning. The comparative swiftness of the final stages of some motor learning after a long and unsuccessful preliminary " practice " period indicates that the necessary neural reorganization is indispensable to the mastery of the skill.

Thus, one 8-year-old girl who had had several summers' swimming opportunity did not really acquire more than a feeling of tolerant familiarity with the water until she reached a lake where her father had been a camp counselor in his youth. That very day with practically no instruction she began to swim a distance of 50 feet or so at one time, repeating this many times, and remained in the water upward of 5 hours thoroughly enjoying herself. An episode of this sort is not something unusual nor is the interpretation to be buttressed by a dramatic anecdote. Evidently the swimming experience of most persons conforms to this general model: inability to swim a yard followed in a few weeks after the focal learning by ability to swim almost a mile where the person's physique permits. After all, the stroke combination used on the fifth occasion is not structurally very different from that used on the five-thousandth.

Differences in motivation, social and physical factors, and perhaps sheer maturation determine many details, but the broad picture is clear enough. A long period of little or no measurable headway, then a quick sharp rise followed by a slower and less spectacular gain in the learning curve — this is the type followed by skills which have an all-or-nothing character. The difference between swimming and non-

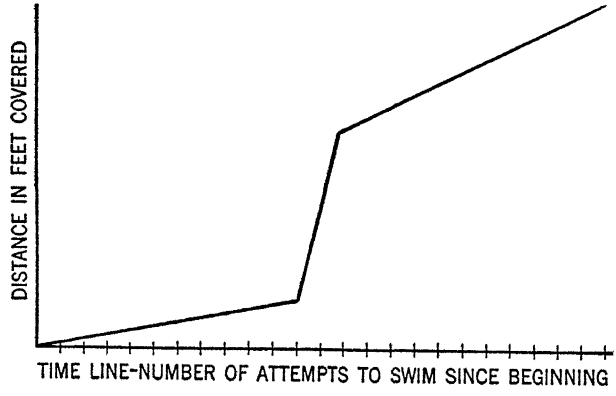



FIGURE 38

Schematized *individual* learning curve for a motor performance like swimming or walking. For *groups* the angularity would disappear and a smooth serpentine S curve inflected at the same points would be substituted.

swimming is usually apparent to an observer, although the nonswimming stage of effort appears to be necessary to prepare the ground for the appearance of the figure.

**Progressive integration of more adequate configurations.** Walking is an act which is learned by all but physically handicapped persons so early and so uniformly that it has been called instinctive. Careful records of individual babies show that there is little or no true walking up to a certain age, and then within the course of a few days the child is running all about the house. When the walking pattern is finally integrated, it is done swiftly, indicating that once

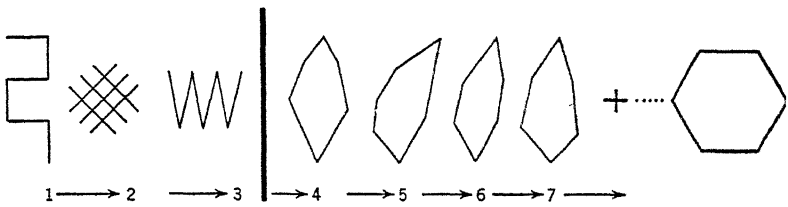



FIGURE 39

Schematic representation of the stages of structural learning.

the organism acquires the " feel " of the act, the rest is a matter of smoothing off the rough spots in the performance. This last apparently is the only real function that drill or practice in the narrow sense actually has. If one thinks of swimming as an act that is done perfectly when a structure like a regular hexagon has been established, then the phases in the learning act may appear as illustrated in Figure 39.

Before the swimming act can be done, the organism must be capable of performing some of the subactions which it includes. These may be represented by the six lines in each of drawings 1, 2, and 3. In his first efforts to swim the learner creates certain " wholes " in which the six components of the mature act may appear. Actually the approximation to the final figure is greater than these first three sketches would suggest — they are to some extent a caricature of what he really does when he splashes about in a frightened and " dis-

organized" way. The critical point is represented by the heavy black bar, for as soon as the learner has synthesized some kind of a "hexagon," no matter how poor and irregular it may be, he is on the road to success in this skill. Concretely, this means he can swim a few yards even if done clumsily and with intense exertion. The irregular hexagons of stages 5 and 6 symbolize the continuation of the "amateur" status and its gradual assumption of more stable and perfected outlines.

This account of the acquisition of any motor skill is highly unorthodox, but the writer's exposition of this before experienced teachers of many skill subjects shows that it is pedagogically acceptable as a straightforward description of what happens and that at no point does it do violence to any known facts. This interpretation assumes that every distinctive motor skill — dancing, pole vaulting, manuscript writing, etc. — has a characteristic structure and that the heart of such learning lies in the vivid sensory perception of this structure and its reproduction in the pattern of movement of the body of the learner. The fact that these structures are not exactly alike creates the difference known as "style"; the fact that they are sufficiently alike to be given the same name (as when we say "Mary and John are *swimming* in the pool") indicates that a common reaction pattern has been established.

**Interpretation of learning curves and plateaus.** Certain empirical learning curves have an appearance which suggests piecemeal and bit-by-bit advance in skill apparently at variance with the "special-pattern" theory here defended. Inspection, however, will show that this is a mathematical artifact due to the units selected to define the ordinates that localize the points making up the learning curve. But even this method of presentation does not obscure the fact that the individual learning curves show sections of rapid progress as soon as the subject reports that he has "got the hang" of the job. Other apparent discrepancies are caused by the use of different criteria of "learning" an act. When, for example, has a girl learned to typewrite? When she can locate any given letter and strike it so that

it appears on the sheet of paper? When she can type her own name? When she can compose a business letter on the machine? Or when she can type at the rate of 100 letters per minute? In animal researches, it has been customary to impose rather severe tests of full learning, such as 10 to 30 consecutive correct runs of a complex maze — a criterion which practically guarantees the *over*learning of a performance to a standard amount. Most quantified work on the course of the human learning curve does not really begin with a zero amount of learning but at some finite distance beyond this point. Neither does the curve extend upward far enough to the absolute limit of improvement; the result is that all empirical curves are only parts of some more complete curve. All these are considerations which point to the difficulty, if not impossibility, of specifying *the* learning curve, *i.e.*, a single line, the equation of which describes the course for *all* learning, with individual curves mere deviations from it. Actually a variety of learning curves are obtained from different functions and different subjects, and while they can be statistically combined into a composite curve, this procedure hides more than it reveals.

The most interesting feature about many learning curves is a flat region of little or no progress that occurs after practice has been under way for some time. Any individual curve may have several such plateaus. It was once thought that a plateau was a necessary element in all motor learning, but this is most improbable. The phenomenon itself seems to have no one single cause, since it can be produced by a number of different factors. First, the plateau may represent no more than an adequate final or temporary level of achievement in the light of the incentives affecting the learner. Increase the motive to improve and the plateau is left behind. Second, the plateau may represent the maximum plane conveniently reached with a certain method of working; if the procedure is changed so that more efficient techniques are used, the plateau is surpassed. Batson and Kao seem to have shown that if the learner deals with a whole performance as a unit, he tends to advance steadily without a

plateau, regardless of the simplicity or complexity of the act.[1] Third, the concentration of the hard parts of a task at a certain stage of the learning may create a plateau which lasts until they are "conquered." The first and second causes seem to occur more frequently than the third and make the plateau a remediable experience. Rearousal of the will to do better instead of being content with a performance that is judged to be "good enough" is helpful, but equally important is the adoption of a better work method where the old has led to a stoppage of improvement. In swimming, for example, there is a clear limit to the speed with which one can swim using a simple side stroke; by acquiring the ability to use the crawl or trudgeon the distance swum per unit of time can be markedly increased. Whenever one's progress seems to be stalled, it is a good rule to ask these twin questions: Am I as strongly impelled to make headway as I should be? Am I using the most efficient single means for improving the skill or function being practiced?

## WHOLE AND PART METHODS OF LEARNING

From the strictly theoretical standpoint, few problems in the psychology of learning are more interesting than a comparison of the relative efficacy of whole *versus* part methods of mastering a given body of material. Such experiments usually make use of fairly homogeneous content like a long poem and contrast the amount of time and number of repetitions required to reproduce it when it is read and repeated as a single unit with that required when smaller subdivisions are successively mastered until the entire task is finished. Most studies concerned with this problem report decisive advantages in favor of the whole method, although a few find a "judicious" modified whole or combined part-whole procedure superior to the straight whole plan.

Unfortunately, the issue has been badly complicated by the ambiguity of the complementary notion of "part" and "whole." Al-

[1] D. L. Kao, Plateaus and the Curve of Learning in Motor Skill, *Psychological Monographs*, 1937, 49, No. 219; and W. H. Batson, Acquisition of Skill, same journal, 1916, 21, No. 91.

though the distinction usually evokes mirth, much of what has been called "part" learning is really "subwhole" learning; *i.e.*, psychologically many alleged "parts" are wholes with a reduced range of inclusiveness. Every whole is a part with respect to some larger whole that embraces it, and every part is a whole when considered in relation to some smaller part contained within it. The superiority of the whole method is most pronounced when the material to be learned is closely articulated internally and tightly knit in structure. Where the characteristics of interdependence and continuity are less pronounced, the superiority is correspondingly diminished, although still maintained. It has been, and remains, sound advice to employ the whole method in preference to the part wherever an option is presented to the learner; the trouble lies in specifying operationally what this means. The idea of "wholeness" in behavior is too vital to be spoiled by a tendency to sloganizing, which, while acting as a corrective to old faults, may pave the way for new ones.

The whole method of learning is designed to prevent that ill consequence expressed by an inability to see the forest on account of the trees. A better perspective on both a city and a task or problem is achieved when one can see them in their entirety. One then begins with a unity that is comparatively easy to differentiate internally, whereas the building up of that unity by the reverse path of joining fractional portions encounters more obstacles even though plainly achievable. In many practical situations this option is not available, but where it is the whole method provides a better mental set. Even then it is usually best to limit the injunction in this way: *In learning always use the largest whole which the developmental level of the organism permits.* If the chunks are too big, the learner is overwhelmed and is denied the needed sense of mastery and progress; if the bits are too tiny, he wastes too much effort in piecing them together into something substantial. The right-sized whole which fits my capacities may be too big or too little for someone else. The "rule" of the whole is not absolute: It must be interpreted relativistically throughout all psychology and not just in learning.

## WHAT ABOUT TRANSFER?

Few problems in educational psychology have been more persistent and disturbing than that one usually designated as "transfer of training." Perhaps this is as it should be for the practical social consequences of one's beliefs about this matter are unquestionably great. Most educators at present are seriously confused on this point and are disposed to attribute to psychologists opinions which it is doubtful if any ever seriously expressed. To be clear and "straight" on the topic is evidently a difficult achievement, but there is no good reason why the basic concepts and findings should not lend themselves to simple treatment.

**Present state of the question.** First, let it be said that psychologists as a group never denied the reality of the transfer phenomenon (better, phenomena). Transfer of knowledge, skill, or attitude, *i.e.*, anything which can be learned, from one situation to another is not a myth or a fiction, but a well-attested fact of everyday experience. The learning of one performance frequently does have some effect upon other performances, yet it is often devoid of influence on others. That a person who learned to write his name in a school in San Francisco can also write that same name in a Viennese bank is not surprising; but that it should facilitate his learning to ride a bicycle would indeed be startling. Transfer from one learned act to *all* others plainly does not occur — in this sense, transfer is clearly not universal; on the other hand, neither is the effect of learning specifically confined just to the thing learned — in this sense, transfer is not zero in amount.

Second, the older historic theory of "formal discipline" overstated its case. This view is at least as ancient as Plato and holds that the separate mental "powers" like memory and judgment were essentially like muscles, subject to strengthening by exercise on any selected activity, the increased strength being easily used later in other "strange" situations. The faculty psychology which lay behind this view was not the absurd theoretical system many unhis-

torically minded moderns believe it to be. The improved vigor of the leg muscles achieved by long-distance bicycle riding comes in handy when climbing mountains, and the toughening of the arm and back musculature through rowing is not without effect upon one's power to "chin the bar." Lifting pianos does make it easier to lift cement bags, and vice versa. The organism has been made generally stronger by the use of different weights and resistances, and this increased strength can manifest itself in ways far removed from the content of the original exercise. The different mental functions were considered to be like mental muscles, subject to training in much the same way as their anatomical equivalents. The fact that much of the schooling under this program was really more like intellectual "massage" than like vigorous cerebral "exercise" was usually disregarded.

There is *some* truth in this analogical view. The errors were made in faulty pedagogical applications when the notion of "formal discipline" grew in the Victorian era to be a rationalization of academic "vested interests." Geometry, like spinach, was good for one even if one didn't like it; the existence of individual food allergies was disregarded by the claim that a certain "stiff" intellectual diet was best for every learner. This claim of preferred transfer effects for certain subjects, like the Graeco-Roman classics and mathematics, and its pontifical denial of them to the laboratory sciences was an error of intellectual Toryism. The substitution of a more democratic outlook upon the alleged "disciplinary" values of different fields of subject matter was both scientifically and socially inevitable. This egalitarian view of the respective merits of different disciplines rested upon a sounder foundation than did the tradition which it succeeded. The later formal disciplinarians had illicitly substituted a hierarchical authoritarianism for the position of the original faculty psychology which was less concerned with issues of scholastic status and prestige. The doctrine of mental powers did not say in effect that it was better to develop the biceps than the triceps muscle or that these structures would be strengthened more by wrestling than by boxing. It was the

equivalents of these claims in the scholastic world that led to a rejection of this snobbish evaluation of the different fields of learning.

Third, the contemporary emphasis in educational psychology seeks to rehabilitate the concept of transfer without returning to the preposterous and dogmatic claims of nineteenth-century educational conservatism. The frequent tragic failure of knowledge and attitude to transfer from one course of study to another or from academic to personal and community affairs provides a constant stimulus to the discovery of ways and means for making learning "functional," *i.e.*, actually operative in life situations. It is a pathetic comment upon the efficiency of both teachers and pupils when such a complex acquisition as "scientific method" is enthusiastically employed in quantitative chemistry and yet is not only absent but even rejected by these same individuals in domestic and international matters. Inconsistencies and contradictions are prevalent personality and cultural attributes at the present time, and a common psychological explanation thereof is "no transfer." It is not unlikely that transfer is reduced below what it might be because so many teaching methods are based upon a disbelief in achieving it at all; consequently, transfer effects do not appear when no attention is paid to ensuring them. This excessive specificity view ties both teacher and learner to the immediate situation and limits their power to transcend it. No one seriously believes that a child who has learned to cross a street only when the green light is "with" him will be able to do this when Chrysler and Chevrolet automobiles are on the highway but not with Fords and Studebakers if his "practice" has not definitely included the latter cars! The fact that we can use any learning at all outside of the original situation in which it was acquired shows that some transfer exists. How can it be increased?

**Pertinent experiments.** The core of every learned act lies in the cerebral structures and not in the receptors or effectors that it employs. These latter mechanisms are not only subordinate to the cortex, but are also interchangeable to some degree. A simple illustration will show that the precise peripheral components of a learned

act are not vital to it. Suppose one meets a stranger on a day when the left eye is bandaged. The only visual nerves that can be used in getting acquainted with the appearance of this person are found in the right eye. A week later the bandage is placed over the right eye, leaving the left eye to do the optical work of the orientation. The stranger reappears in one's presence. Will he be recognized by the left eye as the man the right eye saw a week before?

The answer is an emphatic yes, but it is curious that this complete bilateral transfer effect has not been a commonplace in our thinking about the larger problem. One investigator actually felt it necessary to bandage one eye of a rat during a discrimination study involving the differentiation of a circle from a square before being convinced that the "unused" or untrained eye was as capable as the "used" or trained eye in making the learned discrimination during a critical test. This type of experiment was also successfully repeated by Lashley on a monkey whose arms were "reversed" in a similar fashion. He cauterized the motor area in the right hemisphere, an operation which "paralyzed" the left hand, leaving the right one the preferred one for finger work. In this condition, the monkey learned to open three latch boxes using just one hand for the job. Later, Lashley operated again, destroying this time the motor center for the right hand, leaving the somewhat recovered left hand as the preferred instrument for manipulation. Yet the animal had little difficulty in solving his puzzle box with the originally incapacitated hand. The transfer of skill from one bodily member to another was complete. Not only were the limbs and their innervations shown to be nonspecific in their action upon the learned performance, but apparently neither the left nor right motor region was indispensable to the task or the locus of the neural change produced by the practiced skill.[1]

These are facts of elemental significance for the transfer theory. Apparently the organism can learn even though none of its separate organs are essential to the learning, *i.e.*, in the first case just mentioned

[1] K. S. Lashley, Studies of Cerebral Function in Learning, *Archives of Neurology and Psychiatry*, 1924, 12, 249–276.

neither the left nor the right *eye* did the learning, but the *person* in whom these organs were found. In a certain paradoxical sense, therefore, no transfer and complete transfer both occurred, *i.e.*, since the organism was the same it did not need to transfer any skill to itself but simply did with one member what it previously had done with another.

**Two contrasted theories.** The connectionist view, sponsored most strongly by Thorndike, that transfer from situation A to situation B occurs only when there are " identical elements " in either the stimuli or the responses may be formally correct, but the identification of these identical components is a most elusive task. This theory of " partial identity " argues that improvement in addition will alter one's ability in multiplication because addition is absolutely identical with a part of multiplication. We may accept Thorndike's claim that there must be some *likeness* between two functions before there can be any instance of transfer between them; the practical difficulty comes in specifying the exact nature of this likeness. Thorndike himself oscillates between an exaggerated specificity of detailed items and very generalized sentiments as causes of transfer. As G. W. Allport says, the real problems come in deciding how elementary is an element and how identical is an identity. To quote:

> We are told by Thorndike that a person's ability to estimate the length of 100 millimeter lines is essentially independent of his ability to estimate the length of 50 millimeter lines. Since in experimental investigations it is found that training in one of these abilities does not appreciably affect the other ability, they are regarded as containing no appreciable elements in common. One wonders whether the abilities involved in estimating lines of 100 millimeters and 75 millimeters are still separate; and how about the abilities to estimate lines of 100 millimeters and 99.999 millimeters? In another connection, we are told that there are " as many memories as there are facts to be memorized "; each memory is regarded as an element in itself. But what is a " fact to be memorized "? Is it a syllable, a word, a sentence, a sequence of sentences, an entire poem verbatim, or the general sense of the poem?
>
> At the same time, extensive mental processes, such as " aims," " moods," " ideals," " knowledge of procedure," and such enormously

complex functions as " esteem for truth wherever and however present " are alleged as elements. If transfer can come about through such generalized components as these the term element must lose its reference to " common cell action in the brain." To propose [that these have] a rigid and specific location in the nervous system is to propose an absurdity.[1]

Another weak point in the elementaristic or atomistic approach expressed in the " identical elements " theory of transfer is the failure of *proportionate* transfer to occur as the theory implies. Several experimenters have reported more transfer effects between dissimilar data than between similar data. The amount of transfer presumably should depend upon the number of identical elements present in the two situations being compared, but this does not seem to be the case. This appears even in the classic experimental report of Thorndike and Woodworth where the improvement due to the transfer of subjects' estimates of areas from a practice series was greatest with figures that differed *most* in size and shape from those with which the training was originally secured.[2]

Allport maintains that the equivalences and resemblances we often see among objects that have no obvious identity of components (unless the common component be a subtle structural one), such as saying that a certain person's voice reminds one of blotting paper, are the real basis of transfer and not the overlapping " elements." Because the writer finds himself in essential agreement with this position, another quotation elaborating it may be given: [3]

For all its individuality of form, and for all its unpredictability, the sense of similarity is the subjective condition *par excellence* of

[1] G. W. Allport, *Personality*, New York, Henry Holt & Company, Inc., 1937, p. 269.

[2] R. S. Woodworth and E. L. Thorndike, The Influence of Special Training on General Ability, *Psychological Review*, 1900, 7, 140–141, and 1901, 8, 164–165. Related data appear under the title, The Influence of Improvement in One Mental Function upon the Efficiency of the Other Functions, *Psychological Review*, 1901, 8, 247–261, 384–395, 558–564.

[3] G. W. Allport, *Personality*, New York, Henry Holt & Company, Inc., 1937, p. 269.

transfer. If a student sees similarity between the Greek grammar at which he drudges and his own love of logic, mutual transfer results; if not, there is no such transfer. If for him there is some meaningful link between his instructor's criticism of his errors in English composition and his sloppy conduct outside the classroom, again transfer occurs.

To *some* students the study of English, psychology, or even of the much despised Latin, may have many valuable resemblances to life. For *others* these subjects are barren, not because they fail to possess elements that specifically overlap with life outside the classroom, but *because the persons can see no similarity*. For this group more "practical" subjects, such as business English or advertising, may kindle the undying flame.

Similarity is, then, seen to be a highly individual matter. Its operation is difficult to predict, and educationally it cannot be standardized. Under certain special conditions of conflict and confusion, it may lead to negative transfer. To be sure, a teacher often points out resemblances between the experiences of his students inside and outside the classroom, but the results are unpredictable. Some remain impervious to the effort; others who have what James called "the electric aptitude for analogies," may perceive the similarities that the teacher points out and many more besides.

. . . Just because it is personal, the transfer value of any item in the school curriculum cannot be standardized or predicted. Neither for school children nor for adults are similarities *uniform*. Only in the sense that the transfer value of similarity evades standardization for the group is it lawless; in the sense that it always harmonizes with the individual life-history it is lawful.

**Transfer occurs when the learning is "generalized."** Back in 1905, Bagley and Squire reported a classroom experiment in which the arithmetic teacher gave special emphasis to the value of neatness in arithmetic papers while the other teachers insisted upon no such requirement. As a result the pupils submitted much neater arithmetic papers than before, but their spelling and language reports were unchanged. Ruediger's repetition of this experiment is interesting because of the important variant he introduced. In all these schools, the teacher not only stressed neatness in his own subject but empha-

sized its general merit, *i.e.*, it was praised as an ideal in home, business, and in personal appearance; no specific reference, however, was made to other school subjects. However, on this occasion, as distinct from the first experiment, the pupils did exhibit increased neatness in their papers for other subjects. If neatness — or any other characteristic — can be unambiguously developed as a universal desideratum, the learner has little trouble in making the application to all sorts of situations, provided the motivation is kept high.[1]

Another older but equally "classic" study designed by Judd points in the same direction. Convinced that "theory" correctly understood was not unrelated to common "practice" in the area with which the theory is connected, Judd had two similar groups of boys in Grades V and VI try to hit a target under water with a dart. This task differs from ordinary aiming because of the apparent displacement of the submerged object due to refraction. One group was simply instructed to proceed with its efforts to hit the target while the other was first given some explanation of the refraction phenomenon before starting its practice. Advance knowledge of the principle responsible for the difficulty in accurate aiming under these circumstances was the only experimental difference between the two sets of learners.

At first the performance of the two groups did not differ since both of them took about the same amount of time to hit the target. Apparently the possession of the preliminary insight was of no great immediate advantage since the sensorimotor co-ordinations responsible for skill in striking took about the same time to develop. However, the advantage of the theoretical training appeared as soon as the conditions were changed by altering the depth of the water with its corresponding shift in the apparent displacement of the object. The boys who knew nothing about refraction were badly confused whereas those who did adapted themselves readily to the new test. It was only

[1] W. C. Ruediger, Indirect Improvement of Mental Function through Ideals, *Educational Review*, 1908, 36, 364–371; and W. C. Bagley, *The Educative Process*, New York, The Macmillan Company, 1905, p. 208.

when this second arrangement was made that the real adaptive advantages of understanding a general theory emerged. One may say that "pure" theory and "pure" practice devoid of connection one with the other are equally impotent to bring the learner to the highest levels of performance. What this experiment plainly shows is that the unity of theory and practice in one coherent action-whole provides the basis for the best forms of adaptive behavior. The value of the theoretical insight is that it integrates and summarizes a collection of independent experiences and provides the learner with more resources when he begins to grapple with a strange situation. Generalization of this type frees the organism from slavery to a specific habitual response and provides the basis for the best transfer effects.

This ability to make the kind of *transposition* demanded by the objective situation is all that "transfer" involves from a strictly educational point of view. Its occurrence is one of the proofs that the appropriate insight has been developed. It is one more of the numerous ways in which an organism manifests its intelligence, and it is therefore not surprising that most investigators report greater transfer with bright pupils than with dull, although both exhibit it. The transposition of relational patterns occurs all the way from ameba to man. A standard experiment that yields positive results with all species consists in placing the animal before a bank of three illuminated windows, one bright, one medium, and one dark. Some subjects are

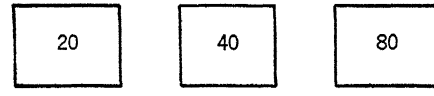



FIGURE 40

trained to go to one and some to the others. If the entire light gradation is changed upward or downward the animals in the retest period go to that light which preserves its gradient relation to the rest of the triad regardless of spatial position or absolute intensity. For example, suppose the wattage in the training series is like that shown in

Figure 40. Let us say that one group of animals has been taught to go to the middle light (40 watts). In the new situations (Figure 41) it will go to the 20- or 80-watt lights because these stimuli now have the quality of the "middle intensity" which was right originally. Scaling the total illumination toward greater or less brightness does not affect

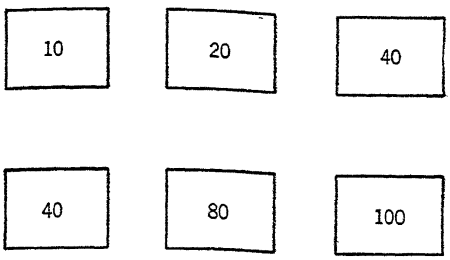



FIGURE 41

this response to a "ratio." This is a primitive form of behavior, but similar reactions to the systemic or structural features of a situation are made at the highest transfer levels in man. Where the learner and the teacher both appreciate this fact, the most favorable transfer effects are bound to be achieved.[1]

[1] The high tide of the antitransfer movement among educational psychologists seems to have been reached around the middle 'twenties and has slowly but steadily receded. A chastened and modified transfer position, wholly in keeping with the hopes of progressive education, has been restored. According to one authority, a study of the transfer experiments between 1927 and 1935 shows that about 70 per cent of them "support the conclusion that the effect of practice is general, and that therefore transfer takes place most effectively through *conscious generalization*, whereas about 30 per cent may be classified as supporting the theory that practice is specific and that transfer therefore takes place through *identical elements*." *Cf.* Pedro T. Orata, Transfer of Training and Educational Pseudoscience, *Mathematics Teacher*, 1935, 28, 265–289. The newer *functional similarity* theory of transfer as advocated in the discussion in the text combines the subjective and objective features, respectively, emphasized in the Judd-Thorndike debate of the first quarter of the century together with a new stress upon "perceptual patterns" absent in both. Much of the literature is as dreadful as the psychophysical monographs bemoaned by James, and many of the difficulties are purely semantic in nature. A new vocabulary may be as empty and as misleading as an older one unless the actual experiences they convey are fully sensed. The writer's treatment has tried to limit the issue to those points that seem to make a difference in pedagogical practice.

## REPETITION AND EXERCISE IN LEARNING

For a long time it was thought that the surest way to learn anything was to keep doing the same thing over and over again until the act was automatized or perfected. This view was embodied in the familiar adage, "Practice makes perfect." This claim seems so clearly justified by the deliverances of ordinary experience that most persons are mildly astonished to discover that educational psychologists have been compelled to reinterpret this so completely that the notion is about to be discarded as an outworn and erroneous concept.

This result flows from many analytical studies of the learning process itself. A little reflection shows that the first and last stages of any learned performance are remarkably different — obviously the final state could not have been achieved merely by repeating the initial attempt. All that such a procedure could achieve would be adeptness in error! The smoothness and grace of an accomplished ice skater are lacking in the awkward first efforts of the beginner. As we showed earlier in this chapter in tracing the formation of motor skills, the characteristic design of the movements in ice-skating must first be captured and then polished and shaped until every superfluous variant has been sloughed off. Interpreted rationally, practice merely means an *opportunity* to continue this reorganizing process; taken literally as the precise duplication of earlier movements, it can never lead to the finished ease implied in the idea of perfection.

Late in the 1920's Knight Dunlap startled his confreres in psychology and bewildered many educators by announcing his conviction that repetition could, under certain circumstances, lead to the elimination of an act rather than to its strengthening. Theoretically, and *a priori*, exercise and learning may bear this relation to each other:

1. Repetition strengthens learning (alpha hypothesis).
2. Repetition weakens learning (beta hypothesis).
3. Repetition has no effect upon learning (gamma hypothesis).

The beta hypothesis received considerable support from the demonstration that many typewriting errors — such as the frequent reversal

of letters due to poor timing by which "the" is written "hte" — could be overcome by *deliberately making the mistake several times with a full awareness that this form is an error.* Misspelling a word helps to spell it correctly, provided one knows at the time that it is being misspelled! If "pure" repetition of a fault is as damaging to behavior as commonly assumed, then the important modification needs to be made that knowledge of an error at the time it is made facilitates its extinction. The larger purposes of the organism apparently are in control of the situation, for without a recognition that one is making an error intentionally, the exercise alone would not eliminate it. The "will" of the learner (not to be construed as any special agent or entity other than the learner himself in a certain condition) neutralizes any inherent bad effects of the wrong practices because their repetition is seen as part of a larger plan of improvement.

**Arguments against the pure or unmodified theory of drill learning.** The limitation of the repetition or exercise factor as a cause of learning is seen whenever one asks what happens to the errors which are eliminated during the course of learning. So far as one can tell they disappear entirely as soon as the right response is made. There are numerous situations in daily life and in the laboratory where the individual makes far more errors than correct reactions, sometimes in the ratio of 1000:1, and yet the false exercise has little or no power to control future behavior, provided a better response has taken its place. The response that will occur is determined more by the "context" and organization of the new situation than by the fact that certain simple reactions have been cumulated before. Gottschaldt's brilliant experiment establishes this point so convincingly that it should be burned into the professional conscience of every teacher. He had his subjects look at many hundred successive exposures of figures (such as those in Figure 42) until overlearning was amply assured. Certainly no one can deny that a person who saw these figures, *a* and *b*, over and over again had had plenty of exercise reacting to them. He then showed the subjects drawings *c* and *d* and noticed that it was only the rare subject who saw the *a* figure in *c* and the *b* figure in *d*.

The lines of the originally drilled figures are "there" in a physical sense, but psychologically they are not perceived because they are embedded in quite different wholes. The "camouflage" of the new pattern has destroyed the independence of the "exercised" responses and converted them into dependent portions of the new field.

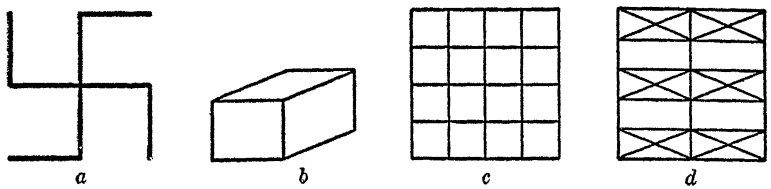



FIGURE 42

Apart from these experimental demonstrations of the relative inefficacy of sheer repetitious drill to control future behavior, there are certain simple deductions that can be made from one's own experience. Ask any group of vocationally successful adults in the various professions how much drill they have had since their school days, drill being illustrated by the usual method of learning the multiplication table. Then ask them whether they have learned anything since their college graduation. Almost unanimously they deny having had much, if any, drill and yet they rightly insist that they have learned a lot since their formal schooling ended. Since there can be learning without drill, it is plain that drill is not needed to produce important modifications in human conduct. If one wishes to achieve perfect mastery of a Liszt composition on the piano, one must undoubtedly continue to develop control of the auditory and motor "form" it contains until it can be reproduced as desired; but even here the ultimate expressive qualities peculiar to the skilled player go far beyond the monotonous duplication of early finger exercises. Repetition alone can never explain what he is able to do at the end.

An exclusive emphasis upon the importance of drill in establishing dependable responses has the effect of making the organism the slave of a set of external exercises. Actually the living system protects itself from such a fate by refusing to modify its behavior in other than

a superficial way unless the repetitions harmonize with its inner purposes. No habit goes any deeper than the aims and goals of the learner permit. This is somewhat tragically illustrated by the evidence that the repetition of "good" habits acquired in prison or in a reformatory fails to be effective if the interests and ideals of the prisoner are not first altered. The important study of the Gluecks [1] shows that 80 per cent of the men discharged from penal institutions (which systematically operated on the principle that good habits as such make good citizens) continued in their criminal careers when investigated 5 to 15 years later. Where the dominating attitude toward life and society had been changed for the better, the more detailed habits of living and working tended to take care of themselves. But in most cases the drilled actions failed to summate into good citizenship because they did not represent the individual's own aims and goals. The false assumption that exercise *alone* will guarantee the learning and retention of an act is responsible for an enormous amount of futile waste both within and without prison walls. The will to learn, the development of insight, and the presence of satisfaction in that which has been acquired are far more potent forces in creating modification than pure repetition at its best ever could be.

One of the strongholds, if not the inner citadel, of the drill theory of school learning is found in the standard practices of elementary arithmetic instruction, notably those concerned with number combinations. When it is proposed by serious students of educational psychology that drill be abolished or at least reduced to the absolute minimum in school life, many teachers, parents, and even pupils turn incredulously and ask how else can the multiplication table be learned. Part of the difficulty here lies in misunderstanding the counterproposals of the antidrill advocate, and part in a lack of acquaintance with certain key studies which have quite effectively demolished the basis for specific repetition as a means of efficient learning.

[1] S. and E. T. Glueck, *500 Criminal Careers*, New York, Alfred A. Knopf, Inc., 1930.

For example, it is still widely believed that each distinct number combination must be taught as a separate item of drill or else gross defects in number work will arise. This view rested upon the eminently respectable theory of specific connections, bonds, or associations between one number and all others. It has the advantage of definiteness and *a priori* reasonableness, but it is plainly wrong where systemic learning is involved. Since there are 100 simple number combinations if all possible digits and arrangements are used, it is easy enough to test this claim by giving some second-graders explicit instruction on all 100 simple combinations in addition and an equal number in subtraction while a comparison group is taught only 55 of these "pairs." An experiment by Olander using this plan showed that the ability acquired by the children trained on about half of the combinations transferred almost completely to the remaining half which had been left untaught! Evidently these children had acquired a body of interrelated experiences and not just an *n* number of separate bonds. The drill theory is at a loss to account for the equally good performance of the children in the contrasted groups, particularly since the 55-category did almost as well on the number combinations not directly drilled upon by them as did the pupils in the 100-category who had had such experience. A number system that contains laws or principles producing internal coherence need not be assimilated by the method of specific repetition or drill on each of its distinguishable parts.[1] The drill technique will not prevent some pupils from developing the insights appropriate to a recognition of the interdependent aspects of the number series; but why should the grasping of this basic meaning of number work be left to chance (by concentration upon mechanical reproduction) instead of being made a primary goal of arithmetic teaching?

## MOTIVATIONAL FACTORS FURTHERING LEARNING

Every experienced teacher recognizes that learning proceeds best when some strong drive is aroused and maintained and every pupil

[1] Cf. H. T. Olander, Transfer of Learning in Simple Addition and Subtraction, *Elementary School Journal*, 1931, 31, 435–436.

who is honest with himself knows equally well that without some motive and interest in his tasks the learning is either not done or is done poorly with little pleasure. The instructor with any institutional or personal authority whatsoever usually finds himself distributing rewards and punishments to his pupils as a means of encouraging proficiency in his special subject. This may take the form of mild oral praise, definite disapproval of some response, an opportunity to get better acquainted personally with the teacher, and other major and minor features of ordinary school life. The precise effects of these motivational controls whether deliberately or unwittingly applied, are rarely known to those who use them despite their central psychological significance to the work of the school.

One of the principal errors to avoid in thinking about the effect of reward and punishment upon later behavior is the mistake of absolutism which assumes that what the teacher considers rewards or punishments are experienced as such by the learner. This is far from being universally true. When an unpopular instructor sends a boisterous high-school boy out of the classroom, the social relations may be such that he does not feel punished by this act and may actually gain in the esteem of his fellows who admire him for courageously violating a harsh or unpalatable set of rules. Functionally, therefore, what the teacher in this instance intended as a punishment to decrease the likelihood of a recurrence of the undesired form of conduct actually took on the quality of a reward. Similarly, something designed to serve as a reward may be reacted to as a type of punishment, *e.g.*, to be made a "monitor" during the temporary absence of the teacher from the room may be a sign of the instructor's trust but may make the youngster thus chosen utterly miserable if it exposes him to "razzing" from his classmates. Peculiarities of the social situation alone do not account for these inversions of reward and punishment, for they also appear when the structure of an individual's purposes are such that common incentives are of no avail. A glass of beer is a poor reward to a sweating workman of prohibitionist convictions and a bit of night-club entertainment is equally inappropriate to the sober-minded salesman who may have

broken a company record the preceding week. Neither is confinement in prison necessarily a punishment to a political offender under a tyranny — it may produce a curious elation and satisfaction which personalities differently organized do not appreciate. Some of the practical surprises and experimental oddities that one occasionally encounters can be better interpreted if this insight is brought to bear upon them.

**Influence of the will to learn.** One cardinal principle of learning has never been challenged, *viz.*, that the person who freely desires to learn — whose immediate mental set and general attitude are directed toward the mastery of the act or the material to be learned — will learn more and better and faster than another who has little or no intent to achieve in this direction. The truth of this generalization is usually clear without extended verifications, but the implications of it are so far-reaching that every prospective teacher should make his own experimental demonstration of the law. Take any paragraph of connected discourse (any one chosen from this volume will do!) and make about 10 carbon copies of it. Ask 10 of your friends to read it aloud individually in your presence under these conditions: Five are told to read it primarily for the sake of producing maximum clarity of enunciation and the other 5 are told to read it with the intention of reproducing as much of it as possible on a later occasion. Immediately afterward, give each subject a blank sheet of paper and tell him to write down as fully as he can either the exact words of the original or the substance of the paragraph in terms of its separate ideas. Despite the crudity of this arrangement, it invariably shows a much lower retention score for the " enunciation " group, no matter which method of testing is employed. A repeat or delayed measure a few days later normally increases the discrepancy in the performance of the subjects being compared. The two groups read the same material, but one takes it chiefly as an exercise in voice culture and the other as a challenge to its powers of understanding and memory. The main learning in both cases is concerned with the emphases established in the instructions. The different purposes

created by the different instructions operate to yield impressively different results even when the "exposure" time and content factors are kept constant.

The mental "set" of the learner takes two forms — an immediate, temporary, short-term selective adjustment favoring one type of response (as illustrated in the paragraph preceding) and a more comprehensive and more enduring attitudinal disposition usually known as "interest." Just as we learn best that which harmonizes with the momentary direction in which our attentive energies are being steered, so it seems equally clear that certain fairly permanent preferences make it easier for the organism to learn whatever accords with them. When meanings and values are concentrated in certain areas of human experience and are sparsely present elsewhere, learning proceeds easily and efficiently in the former case and reluctantly, if at all, in the latter. Material that is not relevant to the learner's needs *as he sees them* is assimilated only under heavy resistance. Pedagogically, the establishment of a facilitating mental set toward certain forms of skill or knowledge is half the battle in creating competence in them. The thing to be learned must be appreciated in terms of its pertinence to the passing or stable aims of the learner before the effort at mastery is vigorously made.

**How does punishment for errors influence learning?** One popular opinion declares that if we could be promptly punished, *i.e.*, subjected to an electric shock, a smart rap on the knuckles, or some equally unpleasant stimulation, whenever we made mistakes in spelling, computation, courtesy, reasoning, or any other performance, the errors would then promptly disappear because the organism tends to avoid situations that give it pain. If the penalties accompanying behavioral maladjustments were inherent consequences of the wrong acts themselves, something could be said for this plan of systematically inducing discomfort whenever norms of any kind are violated. Unfortunately this simple schema runs up against the tendency of the organism to feel resentful and hostile toward the human source of the punishment since the learner is not always in a position to

understand why an error is an error. Where this condition obtains, the teacher or whoever else is responsible for the administration of the punishment is in grave danger of having a mixed emotion of fear and antagonism attached to himself as the dispenser of discomforts, a consequence fatal to effective instruction in the future. Where an educational aim is to be served, punishment if applied at all must fit the learner's level of insight into social and other objective relations. It may, to be sure, sometimes succeed in furthering the emergence of critical insights, but as a rule this is a dangerous and uncertain procedure. If the punishment is beyond the learner's understanding — if, in other words, he does not comprehend why he is being punished and "accept" it as a logical and justifiable consequence of a blunder — then the effect of the punishment is merely to make him feel unhappy and distressed without producing any immediate or ultimate "constructive" result. Since education is committed to the promotion of human happiness, there are good general reasons why positive punishment under most circumstances should be excluded as a method of controlling behavior. If the punishment is so presented that the *informative* aspect dominates in the learner's mind, it can be helpful in producing desirable modifications; but if the *punitive* feature is outstanding, a disorganizing sense of being victimized by someone's vengeance is all that is achieved.

One investigator [1] studied the effect of the much used and easily applied electric shock on college students' performance. The task was the equally familiar maze-learning activity arranged so that one group received an electric shock whenever an error was made, while another learned without this "help." The nonshocked group did better than the shocked subjects by learning the maze in an average of 14.64 trials to the others' average of 19.59.

Some experimenters have tried shocking or "punishing" the learners when they made the *right* response with the very curious result that they often did better under these circumstances, despite the expectation that punishment would "stamp out" the reaction.

[1] M. B. Jensen, Punishment by Electric Shock as Affecting Performance on a Raised Finger Maze, *Journal of Experimental Psychology*, 1934, 17, 65–72.

Apparently in these instances an electric shock of mild intensity instead of being a true punishment was psychologically converted into a reward or at least a signal that the right thing had been done. The facilitating effect is thus to be explained in terms of the help that the "pain" gave by way of guiding information. Muenzinger's [1] extensive work on this problem seems to show that punishment for right or wrong reactions has no marked differential effect on learning and that even "punishment" and "no-punishment" groups do equally well on standardized tasks. Since the administration of punishment is a repugnant process to any civilized individual, and since its results are not clearly or consistently advantageous, educators are well advised to diminish any reliance upon this method of fostering learning.

**How do rewards help the learner?** There is almost unanimous agreement among psychologists concerning the uniformly beneficial role of rewards in aiding learning. If an act occurs and if it is accompanied or followed by a glow of satisfaction, this process does seem to "fixate" the behavior and to increase the probability of its later reappearance. If an animal is fed at the end of his run through the maze he learns to go through it more rapidly, with fewer errors, and with better retention than if he just learns to do it by unrewarded (really, less strongly rewarded) exploration. What Thorndike calls the "confirming reaction" is the half-cognitive, half-affective accompaniment of the right act which "stamps in" the particular response to which it is attached. From the standpoint of sheer description, there is no question that these sentences correctly report the state of affairs.

As in the cases of many other fundamental generalizations about the learning process, it will repay the student of human behavior to test the adequacy of this reward function upon a few subjects and himself. Most investigations have reported that the reward offered need not be very impressive to be quite effective, *i.e.*, a simple statement of "Right" has about as much influence as a money reward,

[1] Karl F. Muenzinger, The Function of Electric Shock for Right and Wrong Responses in Human Subjects, *Journal of Experimental Psychology*, 1934, 17, 439–448.

and a small monetary reward is almost as effective as a larger one. We can take our cue from this finding and plan a simple experiment of this sort: Take a group of about a dozen subjects and tell them to listen carefully while you read aloud a list of rarely known dates and allied events with a statement after each "fact" indicating whether it is "right" or "wrong." Thus:

1872 — Publication of first psychological journal in America; this is *wrong.*
1926 — Death of Eugene V. Debs; this is *right.*
1706 — Birth of Benjamin Franklin; this is *right.*
1602 — Great earthquake destroys Lisbon; this is *wrong.*
1889 — North Dakota admitted as a state; this is *right.*
1563 — Henry VIII married Anne Boleyn; this is *wrong.*
1850 — Outbreak of Crimean War; this is *wrong.*
1769 — Los Angeles founded by the Spaniards; this is *right.*
1880 — Garfield elected President; this is *right.*
1905 — Radium discovered; this is *wrong.*

Then read all the events again alone but in random order and ask the subjects to write down the exact dates they had heard before, regardless of whether the experimenter had said *right* or *wrong.* It will usually be found that more of the ostensibly *right* than the ostensibly *wrong* dates are correctly reproduced, presumably because an *acceptance* attitude is operative in one group of items and a *rejection* attitude in another. To know that one knows the right fact is a source of some mild satisfaction, but to know the *wrong* date produces no pleasure unless one is perversely set to learn everything indiscriminately, regardless of its truth or falsehood. In a series of this sort, the objective historical correctness is a secondary factor in the learning as may easily be shown by a variant of the foregoing experiment. With a new group of subjects, reverse the items to which *right* and *wrong* were respectively attached in the first test. Then call for the complete reproduction as before. The incidents and dates will have changed, but again those presumptively *right* are better preserved than those presumptively *wrong,* indicating that the occasion itself is largely indifferent, but that the satisfaction-dissatis-

faction variable is the determining factor. Of course, the actual content of what is learned is not of equal emotional significance, *e.g.*, one's liking for Franklin may make it easier to learn any facts about him than about Henry VIII if this monarch is an object of dislike. In the little demonstration it is assumed that these very subtle influences are roughly balanced in amount in both the allegedly *right* and the allegedly *wrong* series. Similarly, differences in historical background are assumed to affect both sets equally.

Critical analysis of the nature of rewards reveals them to be of two types, (1) those that are appended as an extra to the performance being acquired, and (2) those satisfactions that spring directly from the act itself. Both varieties of reward may be present in any learning extended over a period of time. Under (1) must be included all such varied satisfaction-arousing stimuli as gold stars affixed to errorless papers, the publication of honor rolls, the receipt of praise instead of blame or neglect, etc. The learner is driven to master his job by the recognition that the social esteem or any other desirable state of affairs he craves is dependent on the prior fulfillment of his task. Under (2) is found just one general category of reward, *viz.*, the satisfaction that comes from having achieved one's purpose, no matter what that purpose may be. The person who has learned to swim may feel happy at the evidence of his progress in this skill and also because it is inherently pleasurable to move confidently through the water. Just doing the deed is rewarding, *i.e.*, one prefers to do it rather than not. Type I as a system of reward is employed where the thing to be learned is not set by the learner, but largely determined by outside controls; Type II, on the other hand, is the one dependable form of reward that operates wherever learners are free to choose their own goals and free to decide on the means of attaining them. A pedagogy of imposition must make extensive use of the first category of rewards; a pedagogy of self-direction can confidently rely upon the second to supply all the satisfaction needed to carry the learning to completion. Rewards, or better, satisfactions must be involved in any systematic learning, for without these learning would neither be attempted nor accomplished. Even if it should prove

necessary in " emergency " cases to use extrinsic motivating forces, the educational ideal of moving as quickly as possible to this intrinsic type should never be forgotten. But a major way of improving learning must be the heightening of the pleasure the learner experiences from his learning.

**Different learnings produce different kinds and degrees of satisfaction.** One learns ultimately because life is happier and more pleasurable if one learns certain things than if one does not. But not all that is acquired contributes equally to one's satisfactions. Every experienced teacher knows that the topics included in most conventional courses differ widely in the degree of interest which they arouse in the pupil. No person, whether teacher or student, finds a hundred new bits of information about physics or philology equally attractive. *Optics* and *electricity* may be enjoyable to one who is unmoved by *mechanics* or *heat*. Some facts provoke a thrill of delight and others secure nothing but the most perfunctory response; some may even be positively distasteful.

In one survey designed by the writer,[1] an 8-page booklet containing 234 items from the standard tests and texts in the field of educational psychology was printed with directions requesting the respondent to rate each item separately with respect to its " pleasure " value or the amount of satisfaction felt in recognizing the fact presented. A scale placed beside each item permitted the respondent to indicate the reaction as follows:

| | |
|---|---|
| Pleasure | |
| Considerable | 3 |
| Moderate | 2 |
| Little | 1 |
| Neutrality or indifference | 0 |
| Aversion | |
| Slight | −1 |
| Moderate | −2 |
| Extreme | −3 |

[1] George W. Hartmann and Anson Mark Hamm, Variations in Affective Tone of Different Areas of Educational Psychology, *Journal of Educational Psychology*, 1934, 25, 115–135.

Responses were secured from more than 300 students. Most of the subjects were sophomores or juniors taking their first course in educational psychology. The test was given in a regular class period during the final week of the semester so that fair contact with this type of material had already been attained.

The next step was the computation of the *mean pleasure value* of each item, which was found by dividing the algebraic sum of the checked values placed opposite each statement by the number of individuals responding to it. It is consoling to find that only three of the statements possessed negative pleasure value! Since the composite mean pleasure value for 297 papers was $0.94 \pm 0.012$, it is evident that the average fact encountered in educational psychology possesses some slight but positive pleasure value. In the list below will be found a complete tabulation of the statements arranged in descending order according to the size of the corresponding pleasure index.

| *Pleasure Value* | *Item* |
|---|---|
| 2.04 | Other things being equal, the stronger the motive for learning, the faster will be the learning process. |
| 1.98 | The best advice to parents of a 14-year-old girl who wants to go out at night to meet boys is to invite boys and girls frequently to the home. |
| 1.82 | Distributed practice periods usually yield better returns for the time spent in learning than concentrated practice. |
| 1.80 | A child just learning to talk understands more words than he can use in talking. |
| 1.78 | Learning with intent to remember aids in recall. |
| 1.77 | Exercise of any reaction tends to make that reaction more prompt, certain and easy. |
| 1.67 | Failure to learn school assignments is not always due to lack of learning capacity. |
| 1.62 | Increase in rate of reading does not tend to weaken comprehension. |
| 1.61 | The same standard of performance should not be held for all pupils taking the same subject. |
| 1.60 | The development of a child should determine the sequence of the materials of instruction. |
| 1.58 | The purpose of educational psychology is to provide a scientific basis for the teaching art. |
| 1.574 | In mature oral reading, the eyes precede the voice. |
| 1.57 | Mental tests are not valid or reliable enough to be made the sole basis of educational guidance. |
| 1.54 | The best pupils in a grade will do approximately twice as many problems in arithmetic as the poorest will do, and usually with a greater degree of accuracy. |

| *Pleasure Value* | *Item* |
|---|---|
| 1.53 | The difference between work and play is due to the mental attitude. |
| 1.53 | A measure of intelligence cannot be based upon the quality of handwriting. |
| 1.52 | Making new information personal is a desirable method of arousing and maintaining interest. |
| 1.51 | It is well for a teacher to realize that the backgrounds of perceptual experience of first grade pupils are very dissimilar. |
| 1.51 | Learning is a process of active participation. |
| 1.50 | Interest and ability are not the only factors which should be considered in educational guidance. |
| 1.50 | Children may inherit from their parents superior possibilities of learning school subjects. |
| 1.49 | The Dalton plan conceives of the classroom as a laboratory. |
| 1.48 | Knowledge of success or failure in learning is generally a spur to achievement. |
| 1.46 | General intelligence has been defined as the native capacity to learn. |
| 1.45 | The shy child should not be left alone to find his own emotional outlets. |
| 1.45 | Stimuli which appeal through several sense avenues are the most effective in insuring response. |
| 1.44 | Skill is dependent upon habit. |
| 1.41 | The laws of learning hold for both the genius and the normal person. |
| 1.41 | The MA is generally a better basis upon which to organize public school classes than is the CA. |
| 1.40 | Every normal group has as many very superior as very inferior intelligences. |
| 1.40 | In general, there is a positive correlation between intelligence scores and academic success. |
| 1.39 | Learning is a native capacity. |
| 1.38 | Attention may be habitual as well as instinctive. |
| 1.37 | The Binet test shows that girls are as bright as boys. |
| 1.37 | Rhythm in handwriting depends upon a co-ordination of movement. |
| 1.36 | The intelligence quotient is found by dividing the mental age by the chronological age. |
| 1.35 | The principle of conditioned response is clearly shown in feeling a thrill when your college song is sung. |
| 1.34 | It is easier to form a new habit than to change an old one. |
| 1.32 | A comparison of the mental traits of one twin with those of another shows that twins resemble each other significantly more closely than do ordinary brothers and sisters. |
| 1.31 | Acquired characteristics are not transmissible biologically. |
| 1.31 | Overlearning slows the rate of forgetting. |
| 1.30 | One of the marks of high intelligence is the ability to make many responses to a given stimulus. |
| 1.30 | School tasks should not be employed as punishments. |
| 1.30 | A conditioned reflex is a learned response. |
| 1.30 | When a pupil can add only by making use of his fingers, he is in need of drill to render the responses automatic. |
| 1.29 | Relative brightness of letters and background is a conspicuous factor in the legibility of the printed page. |
| 1.29 | The changes that take place in a person's behavior sometimes constitute learning. |

| *Pleasure Value* | *Item* |
|---|---|
| 1.28 | By validity is meant the degree to which a test measures that which it purports to measure. |
| 1.27 | The average IQ of high school pupils is above the average for the population in general. |
| 1.27 | The amount of transfer of training which may take place between two situations may be augmented by appropriate methods of teaching. |
| 1.26 | Character is the sum total of our habits. |
| 1.26 | If a test measures that which it purports to measure it is said to be valid. |
| 1.25 | The spelling period should not, as a rule, be more than fifteen minutes in length. |
| 1.23 | The habit clinic attempts to supervise the mental hygiene of the preschool child. |
| 1.22 | The variability in reading ability of individuals increases with age. |
| 1.22 | A child can learn to speak any language with equal facility. |
| 1.21 | Children have an instinctive tendency to struggle if held tightly. |
| 1.21 | Imagination in children aged three to seven is predominantly dramatic. |
| 1.21 | Frequent objective and comparable measurements of achievement form the safest basis for constructive supervision of teaching. |
| 1.20 | The range is the difference between the highest and the lowest score. |
| 1.20 | Not all instinctive traits are desirable under present-day conditions. |
| 1.19 | The focus of educational effort has recently shifted from the adolescent period to the preschool stage. |
| 1.19 | An extrovert is usually characterized by an interest in social affairs. |
| 1.18 | Latin cannot be justified on its disciplinary value alone. |
| 1.17 | Preadolescents are less self-conscious and sensitive than adolescents. |
| 1.17 | The curve of satisfyingness generally coincides with the curve of achievement. |
| 1.16 | In general, learners are educated by their own mental responses rather than by the influences provided by the teachers. |
| 1.16 | Words are generally scaled in difficulty according to the percentage of pupils who can spell them correctly. |
| 1.14 | Ideas will not become effective unless they have led to actions with satisfying results. |
| 1.13 | Testing should be a part of the stated administrative routine, and should not be left entirely to the initiative of the individual teachers. |
| 1.13 | What we learn is a reaction. |
| 1.13 | Very bright children are as strong physically as children of average mental ability. |
| 1.13 | The growth curve of intelligence from birth to the age of 20 is most accurately represented by a curved line. |
| 1.12 | Boys mature physiologically a little later on the average than do girls. |
| 1.12 | The beginning and end of adolescence are hard to determine. |
| 1.12 | The instructional procedures in most high schools are adapted to the average students. |
| 1.11 | Mendel's law is a generalization based on observing the results of cross-breeding. |
| 1.11 | The modifiability of our nervous system determines our capacity to learn. |
| 1.10 | Heterogeneous grouping is undesirable because it works an injustice to the bright pupils. |

| *Pleasure Value* | *Item* |
|---|---|
| 1.10 | Instincts need to be redirected in order to adapt them to social demands. |
| 1.09 | Day dreaming is most common during adolescence. |
| 1.09 | Rationalization is a form of self-justification. |
| 1.09 | Biological heredity is a large factor in determining mental capacity. |
| 1.08 | Improvement in addition will alter one's ability in multiplication, because the eye movements and certain other processes are in part common to the two functions. |
| 1.08 | Building up meanings for sensations which one receives always involves learning. |
| 1.08 | Habits can be built only when there is some form of reaction. |
| 1.08 | The more habits we have the more free we are to attend to learning new things. |
| 1.07 | In the senior-high-school years grade norms and norms based on equal learning opportunity are more meaningful for educational guidance than chronological-age norms. |
| 1.07 | The brighter the student the less he needs to study in order to reach a given standard of academic success. |
| 1.06 | A baby instinctively shows fear at removal of support. |
| 1.06 | The extent to which a pupil has mastered the subjects in his school curriculum is most directly indicated by his EA (educational age). |
| 1.06 | Ideas of right and wrong are dependent on social environment. |
| 1.06 | Self-assertiveness is sometimes a compensation for shyness. |
| 1.05 | Suppression of articulatory movements aids in the speed or accuracy of column addition. |
| 1.04 | The pubertal development of the two sexes occurs at different times. |
| 1.04 | If a reaction occurs when there has been no opportunity for learning it, the reaction is instinctive. |
| 1.04 | Two groups may have the same means but differ in variability. |
| 1.04 | The natural or direct method of teaching foreign language means that all instruction and responses are in the foreign tongue. |
| 1.03 | A control group is necessary to every sound study of transfer. |
| 1.03 | The curve of mental and physical growth is rapid at first and then slows down. |
| 1.03 | Variation between individuals in improvement is most likely due to original nature. |
| 1.03 | The word "thinking" is popularly used to designate memory, imagination, and problem solving. |
| 1.02 | When reading is taught by the word method rather than by the letter method, instruction in spelling should be begun after reading. |
| 1.02 | When a practice curve increases very slowly at first and then rises sharply, it is said to be positively accelerated. |
| 1.01 | Ordinarily, it is a bad policy to form a bond which will later have to be broken. |
| 1.01 | A mature writer can form letters correctly when he is blindfolded by making use of kinesthetic control. |
| 1.00 | The part method of memorizing is seldom the equal of the whole method. |
| 1.00 | The quality of school work is no index of intelligence unless age is taken into account. |

| *Pleasure Value* | *Item* |
|---|---|
| 1.00 | The rate and comprehension of oral reading is less than that of silent reading. |
| 0.99 | When a mature reader reads increasingly difficult material the number of fixations of the eyes increases, other things being equal. |
| 0.98 | Ability to read has appreciable influence upon mathematical progress. |
| 0.98 | Limited sampling of a student's knowledge of subject matter is a major defect of the essay type of examination. |
| 0.98 | Women are superior to men in memory tests. |
| 0.98 | An ideal may be described psychologically as consisting of a generalized idea with an emotional connection which controls one's conduct. |
| 0.98 | The probability curve applies equally well to both mental and physical traits. |
| 0.97 | The good thinker is one who formulates many hypotheses, including many wrong ones. |
| 0.97 | Overemphasis upon language in teaching is dangerous because words without adequate perceptual experiences are usually meaningless. |
| 0.97 | Real modification of the behavior of an adult takes place sometimes without awareness of the change. |
| 0.97 | Most of the child's fears are learned. |
| 0.97 | A person of thirty learns as rapidly as a lad of fourteen. |
| 0.97 | All children will not be able to make the same grade if they put forth the same effort. |
| 0.96 | Practice may make imperfect as well as perfect. |
| 0.95 | Habits are decidedly specific. |
| 0.95 | Ebbinghaus was the first systematic user of nonsense syllables in memory studies. |
| 0.93 | The recognition span in oral reading is smaller than in silent reading. |
| 0.93 | When the MA is three and the CA is five years, the IQ is 60. |
| 0.92 | Our ordinary descriptions of individual differences are either quantitative or qualitative. |
| 0.91 | Imagery tends to emerge at points where our thinking is baffled. |
| 0.91 | The Binet test is an individual test. |
| 0.91 | Facial expression is no index of intelligence. |
| 0.91 | The coefficient of correlation is a measure of relationship between two sets of scores. |
| 0.91 | The theory of concomitant development stresses the continuous and gradual growth of mental processes. |
| 0.90 | The mental age of a child as determined by the Stanford-Binet test correlates positively with his ability in reading. |
| 0.89 | The adolescent is usually sure that his inner experiences are unique. |
| 0.89 | In a given statistical distribution the class intervals should be equal. |
| 0.89 | Professional parents produce an undue proportion of gifted children. |
| 0.89 | Rationalization is a term applied to make facts support one's wishes. |
| 0.88 | When we attach meaning to a sensation, we have a percept. |
| 0.88 | Equal practice tends to increase differences in achievement. |
| 0.88 | There is no particular tendency for great men to spring from humble circumstances. |
| 0.88 | Children who develop early physiologically as a rule do as well in school as children who develop late. |

| *Pleasure Value* | *Item* |
|---|---|
| 0.88 | The coefficients of correlation between mental abilities when any large group of people is tested are generally positive. |
| 0.88 | Organic changes under emotional stress are generally adaptations to increase the motor efficiency of the bodily mechanism. |
| 0.87 | Superior handwriting results in a school system cannot be obtained simply by devoting more time to teaching it. |
| 0.87 | For most statistical purposes the mean is a better measure of central tendency than the median. |
| 0.86 | The introvert tends to solve his conflicts by day dreaming. |
| 0.85 | Practice exercises should be corrected by the pupils who have taken them. |
| 0.83 | Efficient thinking does not depend upon imagery. |
| 0.83 | According to a prevalent theory of physiological psychology, learning is always accompanied by a change in synaptic resistance. |
| 0.83 | The habit of repeating questions often leads to habitual inattention. |
| 0.83 | In the past, a larger proportion of classical students have won scholastic honors than any other group. |
| 0.83 | Varying the concomitants is a helpful device in learning to generalize. |
| 0.83 | In a normal distribution, the mode and the mean coincide. |
| 0.82 | Prognostic tests are most useful in predicting future achievement. |
| 0.81 | In motor learning, consciousness should be centered on the objective result of the movement, not on the movement itself. |
| 0.81 | Occupational intelligence limits have been partially determined. |
| 0.80 | Judd believes that transfer is contingent upon the mode of instruction, and is not a function of the subject as such. |
| 0.79 | Large divergencies from the norm occur less often than small ones. |
| 0.78 | The logical order of arrangement means an arrangement of materials showing what place each fact dealt with has in the comprehensive system of the completed science. |
| 0.78 | One of the advantages of the whole method of memorizing is that all the needed associations are approximately equal in strength. |
| 0.77 | Ideas sometimes cause us to disbelieve the evidence of our senses. |
| 0.77 | Mental tests measure intellectual capacity indirectly. |
| 0.76 | An extensive study of the similarities of twins in special mental traits was made by Thorndike. |
| 0.76 | A plateau in the learning curve indicates absence of improvement in units measured. |
| 0.76 | Unconditioned responses are responses that are normal to their respective stimuli. |
| 0.75 | There is normally much variability in physiological age. |
| 0.74 | Using the AR (accomplishment or achievement ratio) as a basis for school marks tends to make marks depend very largely upon effort or studiousness. |
| 0.74 | A strong emotion tends to be accompanied by decreased activity of the digestive system. |
| 0.74 | A gifted man may have a dull son. |
| 0.73 | Children who work most rapidly are also most accurate. |
| 0.73 | More time may profitably be given to reciting than to the reading of the content to be mastered. |
| 0.72 | A child's idea of right is that which " works." |

| *Pleasure Value* | *Item* |
|---|---|
| 0.72 | A neural connection is weakened when the response is unpleasant. |
| 0.70 | An attempt to make a left-handed child right-handed may upset the ability to form habits and the speech center. |
| 0.69 | Where marks are based on a percentage system (70 to 100 per cent) the distribution curve tends to reveal modal points at regular 5-unit intervals. |
| 0.68 | An interval of time is perceived to be longer than it really is when it is filled with events which are tedious and monotonous. |
| 0.68 | The time of teething and the amount of cartilage in the carpal bones are used to measure physiological maturity. |
| 0.68 | A healthy child may be intellectually dull. |
| 0.68 | Emotional excitement does not increase efficiency in learning. |
| 0.67 | The youngest children in a class tend to be the brightest in the class. |
| 0.66 | The AR is usually computed from the results of both achievement and intelligence tests. |
| 0.66 | According to the best available evidence, individual differences are caused by the operation of a large number of relatively independent factors of nearly equal weight. |
| 0.65 | Adolescents of less than 100 IQ will not be likely to achieve satisfying success in college. |
| 0.65 | When any habit becomes fixed, it is annoying to disturb it. |
| 0.65 | Negative correlations between desirable traits are rare. |
| 0.64 | Intelligence tests assume that the people tested have had equal opportunities to learn. |
| 0.64 | The term "apperception" was introduced into educational discussion by Herbart. |
| 0.63 | Monroe devised a silent reading test. |
| 0.62 | People who have the same IQ's have the same degree of brightness. |
| 0.61 | The doctrine of formal discipline grew out of the older "faculty psychology." |
| 0.61 | The will appears free in those instances where intraorganic stimuli are more effective than external ones in dominating behavior. |
| 0.60 | A pupil who works to the maximum of his capacity cannot have an accomplishment quotient of less than 100. |
| 0.58 | The average intercorrelations among mental traits in siblings are about the same as those for physical traits. |
| 0.55 | The intelligence of average pupils in a grade is frequently overestimated. |
| 0.54 | The copious use of mnemonic devices does not strengthen the memory. |
| 0.53 | Strict repression encourages lying and deceit. |
| 0.52 | Control by fear is apt to develop dishonesty. |
| 0.52 | Kittens catch mice by instinct. |
| 0.51 | Franzen suggests use of the AQ as a school mark. |
| 0.51 | The chief difference between the reflexes and instincts is in degree of complexity. |
| 0.49 | EA/MA = EQ = AQ. |
| 0.49 | Stuttering is usually associated with emotional disturbances. |
| 0.48 | Competition is not the best form of motivation and should be used sparingly. |
| 0.44 | A child's attitude toward cheating is primarily the result of his group mores. |

| *Pleasure Value* | *Item* |
|---|---|
| 0.44 | Initial performance is highly symptomatic of final achievement. |
| 0.43 | As a rule, a slow learner retains less than a rapid learner. |
| 0.42 | Children of very superior intelligence are likely to be misunderstood in school. |
| 0.41 | The roots of most functional mental disorders have been traced back into the period of childhood. |
| 0.38 | The rank-difference formula for correlation requires that the differences in the rankings of the two variables be squared. |
| 0.37 | The ideomotor theory states that the presence of any mental content inevitably leads toward the appropriate muscular response. |
| 0.36 | Most criminals begin their antisocial career during adolescence. |
| 0.35 | We are controlled more by our emotions than by our intellect. |
| 0.34 | Mental and physical growth run parallel. |
| 0.34 | The school is frequently a great offender in making children try to do things beyond their capacities. |
| 0.30 | The materials which one reads are perceived only while the eyes are stationary. |
| 0.30 | Studying other languages generally aids little in the mastery of one's own. |
| 0.29 | The favoring of foveal to peripheral vision illustrates original attentiveness. |
| 0.28 | Insisting upon neat writing and arrangement in arithmetic papers will not tend to make pupils write better-looking spelling and geography assignments. |
| 0.27 | Dull pupils become encouraged by being placed in a class where all other pupils are dull. |
| 0.27 | The repetition of a grade or course by "flunkers" results in little improvement of their accomplishment. |
| 0.21 | The conditioned response is relatively temporary and unstable. |
| 0.18 | The educational accomplishment of Jewish children is higher than that of almost any other racial group. |
| 0.17 | The tendency to be afraid of a loud noise is due to instinct. |
| 0.162 | Other things being equal, the reliability of a test is increased by increasing its length. |
| 0.16 | There is little doubt that at least 30 per cent of school children are handicapped by defective vision. |
| 0.15 | The original nature of the Neolithic man was not very different from our own. |
| 0.144 | Unpopular people are particularly apt to become social and religious reformers as a compensation. |
| 0.14 | Training in the estimation of short lines results in no improvement in estimating longer lines. |
| 0.12 | Idiocy is the lowest grade of feeblemindedness. |
| 0.01 | The best pupil in the first grade spells as well as the poorest pupil in the 8th grade. |
| 0.001 | There is no definite dividing line between feeblemindedness and normal intelligence. |
| −0.07 | Mental defectives show a tendency to drift together and form relatively isolated intermarrying groups. |
| −0.26 | The school tends to promote children by age rather than by ability. |
| −0.29 | About 2 per cent of the child population of a community is too defective mentally to profit from instruction in the public schools. |

Of some significance for the student of these problems is the fact that the correlations between the composite pleasure index and the interest scores for psychologist and teacher as determined by the Strong Vocational Interest Blank are 0.31 and 0.24 (±0.08), respectively. These figures suggest, although they are far from proving, that the general level of satisfaction one has with the details of the content of a volume like this has some relation to one's emotional and temperamental fitness for a teaching career!

The reader should be warned that some of the items in this "hedonic" list are no longer to be considered "true" in the light of later inquiries and more recent shifts in theoretical outlook. It would be a useful exercise to try to discover which these are and to contrast the old and new views about the problem implied in the statement. However, the principal service of this list is to show that the satisfactions which accompany learning (or recognition) distribute themselves over a wide range, but that fortunately almost all specific items of information normally fall on the positive side of the pleasure line.

The necessity for considering the effect of emotional responses on learning implied in all the foregoing has been simply and adequately demonstrated even when fairly weak stimuli of narrow scope are considered. Carter, Jones, and Shock[1] asked about 100 children in Grades VI and VII to learn a list of words classified as pleasant, unpleasant and indifferent. Thoroughly reliable differences between the learning scores of the subjects appeared — the performance was best for pleasant words, next for unpleasant ones, and least for indifferent ones. The correlation between ease of learning and estimated pleasantness was 0.40 and with the objective deflections of the galvanometer (an instrument for measuring changes in the electrical conductivity of the body resulting from the application of an "exciting" stimulus) 0.49. The inner and outer evidences of agreeableness roughly approximate each other. Flat, dull, and indifferent content

[1] H. D. Carter, H. E. Jones, and N. W. Shock, An Experimental Study of Affective Factors in Learning, *Journal of Educational Psychology*, 1934, 25, 203–215.

obviously makes little impression upon the learner; even disagreeable material evokes a livelier response, presumably because its biological value is plainly above that of the " neutral " items. The preferential selection of agreeable tasks for learning is one of the major ways by which the organism increases its margin of satisfactions.

## SUMMARY

In dealing with the problem of efficient learning we are touching upon a dominion so vast and rich in important implications for education that it is sheer presumption to claim that a single chapter can do more than to outline a point of view. Memory with its fourfold conventional division into fixation, retention, recognition, and recall, is not developed as a separate theme, but is considered as part of the temporal course of learning itself and a test of its occurrence. We have concerned ourselves little with the neurology of learning, important as this undoubtedly is for ultimate comprehension of some underlying forces, because the effort to improve behavior on the basis of our existing knowledge of individual adaptations could go on even if our brains were made of green cheese or sawdust. The transfer problem has been considered as best understood when *similarity* rather than *identity* or *generalization* is made the key concept in rationalizing it into the rest of our systemic approach. Here as elsewhere one must be careful not to make the theories rather than the phenomena themselves the primary objects of interest — a fusion of the two is the most rewarding and least unrealistic.

Dashiell's honest eclectic survey of the experimental work on learning developed by researchers with distinct theoretical biases indicates that there are eleven main sequential features of all observed learning, whether of the motor-skill or problem-solving sort: [1]

1. The learner must be motivated to make some new adjustment.

2. A field or complication of forces and " drives " is always involved.

[1] J. F. Dashiell, A Survey and Synthesis of Learning Theories, *Psychological Bulletin*, 1935, 32, 261–275.

3. The chief impulse encounters some obstruction to immediate fulfillment.

4. Energy expenditure and apparent activity are increased.

5. The reactions which occur are multiple and varied.

6. These responses are made to relationships among the stimuli.

7. The key relation is that between means and goal.

8. Selection of the most appropriate and most "economical" response takes place.

9. The reactions made originally appear by "chance."

10. The consequences of the reaction upon the organism are crucial.

11. The rate of learning varies in degree from gradual to abrupt.

The only minor objections one can make to this condensed list of common factors is that the theoretical problem of joining these eleven items into some intelligible whole still remains, and that No. 9 is doubtful because strictly "fortuitous" events are an anomaly in orderly nature. The right move in a hard mechanical puzzle may seemingly be hit upon by "chance," but actually no learner when blocked in such a case expects any quotation from the Vedic hymns to help him directly, or to get the answer by whistling a strain from *Parsifal*, or to get the solution by dipping the puzzle in alcohol. His moves are sharply confined within a universe of presumed probabilities.

The status of drill as a means of effective learning has been reconsidered because the repetitious character of drill has tended to minimize the central factors of motivation. Pure exercise as such has little potency in creating mastery of new acts, but strongly motivated occurrences accompanied or followed by satisfaction are the heart of learning. Obviously a performance must happen at least once if it is to be learned or even to show that learning has occurred; a minimal frequency of one is consequently inescapable. It is not the doing as such, but doing deliberately or with pleasure that constitutes normal learning.

The economical management of any learning situation requires at-

tention to many objective or personal conditions which influence the course of specific maturation in any function. The search for the *optimal* combination of circumstances in producing modifications goes on constantly. That distributed practice is better than massed or concentrated practice, active recitation better than passive reading, whole learning better than part — these and many others are all specific techniques that add to the efficient control of the learning process. Efficiency in teaching is simply efficiency in planning the course of learning in others. The writer continues to favor an omnibus definition of instructional efficiency which he formulated some years ago as follows: "The ideally efficient teacher is the one who can accomplish the largest number of important and socially desirable changes in the greatest number of pupils in the shortest possible time, with the least expenditure of energy and with the maximum satisfaction in the learning process and its outcome by all concerned." Efficiency of this sort cannot be approximated without the association and utilization of some of the insights presented in this long and necessarily involved chapter.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Distinguish between a *principle* of learning, a *law* of learning, and a *condition* of learning.
2. Develop the claim that it is impossible to learn discrete material without some form of "grouping."
3. Why are certain experiences perceived as "belonging" together and others as independent or belonging to some other pattern? Do not be content with a single "reason" for this general phenomenon.
4. Tell what you like and what you dislike about the general concept of "insight" as an explanatory principle of human behavior? Remember the term is applied to other areas of psychology than learning alone.
5. How does one determine what is the best *unit* (either of size or any other "dimension") for the purposes of psychological inquiry? How do scientific "units" in general arise?
6. List three instances in your own life where transfer of training in

a true sense seemed to occur, and three where one would have expected it but it failed to appear. What do you believe was the essential difference between these "successful" and "unsuccessful" cases?

7. If a teacher refuses to abandon the use of repetitive drill with his pupils on the ground that this suggestion clashes with "common sense," what precautions would you try to have him adopt in order to make it contribute more effectively to the learning goal implied in the performance?
8. Do you see any relation between the school's obligation to promote the student's happiness and the fact that learning proceeds most efficiently when the learner experiences satisfaction therein?
9. What advice can you offer a person who wishes to master a certain motor performance in the most efficient way, *i.e.*, are you able to specify the "rules" (and their justification) which you believe will facilitate successful achievement?
10. Describe the manner in which "meanings" arise in experience. State the essential *nature* of "meaning" itself. By what tests do you distinguish between a significant and an insignificant or non-significant phenomenon? How do you explain the variety of meanings that apparently can be attached by different organisms to a single stimulus situation? Is there a single *true* meaning of any occurrence and how is it ascertained? What relation do you see between growth in meaning and the processes of concept formation?

## Chapter 11

# THE DEVELOPMENT OF ORIGINALITY AND CREATIVITY

An examination of most national systems of education shows that they provide mainly for the reproduction of the prevailing social type. The young are taught the "social heritage" (rather, such selections therefrom as receive the approval of adults now in power), with the expectation that the values and competencies of the present generation will appear again in the next. We teach our children how to spell "America" and to love the things it symbolizes chiefly because these functions were in turn taught us by our parents and because the experiences of life largely confirmed the implications of this early instruction.

But provisions for variation and "growth beyond the type" have not been made with equal effectiveness or with anything like equal frequency. The "ways of our fathers" have dominated the labors of the schools ever since such institutions appeared; departures from these ways have usually produced hardship for the nonconformist, whereas adherence to them was not only approved but also the easiest adjustment to make. Variations consequently were small and usually well within the framework of "acceptability." For not much more than a century our universities and graduate schools have devoted part of their energy to research and the advancement of knowledge — a function associated with, but psychologically quite different from, the preservation and transmission of information. The emphasis upon originality and creativity has been real enough in the upper brackets of higher education where a new "contribution" to understanding is encouraged and prized, but the rest of the educational

ladder seems to have made this a minor objective where it has not been neglected or even actively suppressed. The genetic continuity of a learner's experience makes this contrast most unfortunate: An adult is not best equipped to exhibit originality in thought, skill, or action by an elementary or secondary scheme of training which, while not actively hostile to this aim, commonly fails to make provisions for its achievement. If a tradition of inventiveness could be established in the school as strong as the tradition of mastery of what is already known, the work of contemporary education would be completely revolutionized in a favorable direction. Since creative response is one kind of human reaction, the psychologist rightly believes that it lends itself to improvement just as any other mental operation is subject to betterment.

## WHAT DOES IT MEAN TO BE "CREATIVE"?

Before proceeding to an analysis of the conditions under which creative activities appear, it would be well to free our minds from two errors which handicap effective pedagogy in this respect. The first is the exaggerated form of gushy sentimentality which, beginning perhaps as a legitimate protest against the rigid confinement of children's behavior within all sorts of cultural norms, finds in every uninhibited word and gesture a manifestation of the creative impulse. There is a sense, of course, in which this is true. The author of the *Proverbs* declares that there is nothing new under the sun, but it is equally correct to say that there is nothing old, *i.e.*, not new under the sun. The first viewpoint sees only the resemblances to the past in the present, but the second is more impressed by the novelties, major or minor, that characterize every fresh situation. These contrasting mental sets are both provocative of useful insights and there is no good reason why they should not appear in the same person more or less simultaneously in the interest of a fuller appraisal of every event. However, very little is gained by speaking of every little personality quirk as an expression of creativeness in the individual in whom it appears. Differences in expected responses are important

because they are the basis for creativity, but not all differences in behavior are creative. They become such only when other valuable characteristics or consequences are attached to these differences.

The second common remark about creativity emphasizes its rarity and implies that any effort to increase its appearance in human beings is foredoomed to fail because of the inherent scarcity of talented minds. This error is the reverse of the first — it magnifies the infrequency of creative responses while the other sees them in almost every random activity. Genius is held to be a law unto itself; one speaks about it with awe and bated breath as though genius were not itself a result of certain fortunate natural circumstances which may be understood and controlled; and creative acts are said to be possible only for persons of high genius, never processes that the ordinary teacher or pupil is likely to engage in. This opinion denies in advance that education has any power whatsoever to increase the frequency or the level of useful originality in the school population and holds that all the school can do is to supply the gifted person with an opportunity to reveal the brilliance that is already there. This is the same unwarranted kind of fatalism which proclaimed the irrevocable fixity and constancy of the IQ and therefore knew in advance that intelligence could not be raised no matter how marked the change in environmental stimulation or the change in the mode of living. The relativism of modern psychology knows no such mental "absolutes." Creativity and originality are obviously aspects of intelligent adaptation; and if the mental level of a person can go up under certain developmental circumstances, it seems reasonable to expect that those functions which are dependent phases of it can also be made to rise, conceivably by very similar means.

**Reinterpretation of human creativity.** A creative act involves the production of something *new* and *valuable*. Usually no one doubts that the writing of a person is a creative deed even though it may range in value from a Shakespearean sonnet to a high-school exercise. A drawing in the same way can be scaled from a cartoon or etching by Dürer to the pencil sketches of a first-grader. Booth's interpre-

tation of his favorite dramatic roles differs chiefly in depth and finish from the less skilled renditions of an amateur theatrical. The housewife who uses a powerful vacuum cleaner to suck flies off the ceiling and thereby kill them is as inventive in her own way as Edison was in his. A creative mind by definition is one that constructively departs from routine in a way that furthers the purposes and happiness of the social group. Such a departure may be of small magnitude and restricted in scope, as is true with most schemes of interior decoration, or it may be of widespread ultimate influence as in the cases of the Darwinian and the Copernican theories.

Creativity, then, is to be construed as a normal goal of all education because it is a normal phenomenon of cultured existence. It does not appear often enough to satisfy our needs any more than kindly acts or beautiful objects are found in experience with anything like optimal frequency. It is a characteristic of all action that possesses a distinctive esthetic quality, because when a person is behaving artistically (in the broadest sense of that term) he is also exhibiting creativity and originality in their most visible form. The artist-teacher — to use a favorite term of Harold Rugg — is the teacher magnified and glorified by the conspicuous presence and use of these features. A well-developed lesson, whether conducted in expository or other style, closely resembles a dramatic episode with its gradual increase in participant tension, the culmination in some significant climax, and the final resolution or denouement. To balance this notion of the artist-teacher we seem to need the concept of the *artist-learner*, *i.e.*, a pupil whose speech, writing, and other performances exhibit these and similar qualities. The effect of having an artist-teacher in action over a period of time must be the eventual production of a class of artist-learners or individuals expert in self-modification and self-expression. It may be that this result is "caught" rather than "taught" in the usual sense, but in either case the form or structure of the response pattern is transmitted to the student and reproduced by him with his own personal emphases added to the total effect.

No narrow view of originality may be reasonably applied to the educational situation, for this tendency to restrict it to the "utterly" new would make Jesus just another Jewish prophet hungering like many before him after a timeless righteousness, Socrates another sophist unsettling the opinions of the young, Beethoven just one of a long line of German composers, and Newton but one of the many gifted mathematicians who flourished around 1700. The really important achievements of creative personalities are commonly built upon the bases supplied by others; their own contributions consist in some rearrangement or closure of the "pieces" they find before them, as in the case of Newton finishing the intellectual job which Kepler had begun and Galileo carried forward. In a lesser way, every person finds his work part of some moving cultural stream — he uses what others provided and others in turn use what he provides. The picture of "creation" presented by the early chapters of Genesis prob-

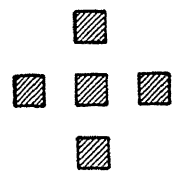


FIGURE 43

ably lingers in the backs of the heads of those who do not see creativity as part of the ordinary course of living. The godlike thing is to create something out of nothing, a concept that obviously runs counter to the principle of the conservation of matter and energy. Out of nothing comes nothing. All instances of creativity, the highest and the lowest, never represent anything more than the reconstruction of something existent in such a way that new experiences or properties emerge. It is a genuinely creative act for a child to place for the first time independently his five toy blocks so that they are arranged as illustrated in Figure 43. It is an equally creative act for an architect to assemble stone, steel, and plaster so that a Radio City emerges out of the less shaped ingredients that comprise it. Creativity cannot

occur without raw materials of some kind at hand, but its essence lies in the activities designated as synthesis and design. This is as true of the work of the inventor, the theorist, the community planner, the sculptor, the statesman, the discoverer of causal relations and interdependencies in disease, at the admittedly highest levels of originality as of the dressmaker, the tinsmith, the menu planner, the toolmaker and diecaster, etc., at the allegedly "lower" levels. The mental processes in all the "crafts" are surprisingly alike; the differences in social appraisal are largely a result of changing standards of value which lead one kind of creation to be more highly esteemed than another. But psychologically the likenesses in form among creative endeavors stand out more prominently than the variations in their content or substance or their placement in a scale of value for others.

## PROBLEM SOLVING AS A FORM OF CREATIVITY

Rediscovering a solution when done without an awareness that the solution is already known is an authentic original act and ranks as an independent discovery even though "credit" or group acclaim tends to go to the person who made it first in historic or chronological time. The growth of all sciences is replete with such instances, many of which occurred more or less simultaneously and led to unlovely disputes concerning priority. What is often forgotten is that many simple or common learnings achieved by all adults are remade by children all the time. Subjectively, for any present-day schoolboy to sense the similarity between the falling of an apple to the ground and the revolution of the moon about the earth is to reinstate much the same experience which Isaac Newton is said to have had first among all men. Mental activity directed toward obtaining an answer to any kind of a problem or task provides an opportunity for originality to manifest itself, particularly where different solutions are possible, or, if only one answer is clearly right, the creativity of the organism appears in the quick emergence of the appropriate insight. The discovery of a cure for war is certainly as important as the discovery of

a cure for cancer; although both of these tasks are usually considered as "problems to be solved," they demand an originality and a creative talent no whit less than that involved in the composition of a symphony or the weaving of a great novel, acts for which the term "creative" is popularly reserved. Since all human creations are types of solutions to definite problems, any improvement in the capacity of school children to solve problems on their level may be construed as contributing something to their eventual powers of creation in larger and maturer fields.

If problem-solving activities are undertaken with an eye not just to finding an acceptable answer to a certain specific question but also with the intent of learning from this problem something that may apply to *all* problems, then such exercises undergo a distinct increase in their educational value. An example that could easily be used to this end on the high-school plane is the following standard laboratory puzzle: The subject is given six matches and told to construct four *equilateral* triangles from them without breaking any of the matches. Almost everyone who receives these items places them on a table top or some similar flat surface and attempts to produce the desired result by a variety of arrangements of the matchsticks. He is, of course, unsuccessful in his efforts since the problem cannot be solved on a two-dimensional basis. The only way to meet the conditions of the problem is to build a tetrahedron, a solid figure. Although the experimenter has not said so, the subject has spontaneously limited his chances of getting a solution by making the needless assumption that the triangles must all be in the same plane. Such an assumption, of course, restricts the subject's attempts at a solution within a fairly narrow frame. Greater elasticity of tacit assumptions together with a more definite picture of the exact assumptions that must be made constitute an important methodological device for increasing one's capacity to handle novel situations.

**Sample cases of "closure."** If one thinks of "four triangles" as △ ▽ △ ▽, it is clear at the very start that one cannot stretch six matches to make 12 sides; consequently, the need to save parts by

having one match serve in overlapping fashion as the common side of two different triangles is indicated and one tends to visualize the final solution as taking this form △△. While one undoubtedly saves matches this way and is therefore encouraged to feel that one is on the road to a solution, the precise requirements of the task are obviously not satisfied. Nor can they be until one's imagination is liberated by the suggestion that the triangles do not need to lie in the same plane — it is then possible to make the further saving in sticks by increasing the number of common sides. One of the functions of imagination is the seeing of things in many different and unexpected relations — an essential factor in all those operations characterized as exhibiting originality or creativeness. Practice in making such "reversals" or transformations of the normal and the expected seems to be a prerequisite to creative activity in many fields. The sun turns around the earth — why not the earth about the sun; God made man — why not man God; individuals are meant to serve the State — why not the State its citizens? Western man is inordinately proud of his machines — why not a society like *Erewhon* which bans them? Etc. This imaginative facility in looking at any situation in a variety of ways, particularly those which emphasize latent possibilities, is indispensable to genuine progress in any of the arts and sciences. The ability to visualize President Roosevelt standing on his head or Chancellor Hitler pole vaulting while perhaps useful in correcting the exaggerated awe commonly bestowed upon such personages is not so helpful to originality as the capacity to envisage more comprehensive situations as something quite other than what they are at the moment. Such a power is not a mere personal ornament but rich in educational possibilities and consequences. Teachers, for instance, who were able or willing to sketch in simple form their views of a Utopian or ideal social state, were also those whose knowledge of the content of the major social sciences was also distinctly greater than that of their less imaginative colleagues.[1]

[1] See the First Yearbook of The John Dewey Society, *The Teacher and Society*, New York, D. Appleton-Century Company, Inc., 1937, pp. 197 and 207.

Speaking generally, in every problem there is something *given* and something *required*. The solution itself is basically that which brings the two components together. Typically, the problem states or implies: Given $x$, to find $y$. If one starts with nothing or with too many unknowns, no real progress toward the goal of an answer is possible. Indeed, a fairly large amount of stimulation must first affect an organism before a problem can be recognized to be such. Problem solving, when successful, revamps the situation so that what was formerly merely listed or indicated is now made a matter of direct response.

This, of course, is none other than the closure phenomenon present to some extent in all ordinary perception. Originality may be thought of as a high capacity for meaningful closure when very little is given and much is to be supplied. Almost all occasions for the exercise of creativity make use of the fact that the suggested completion can be filled in many different ways. An architectural competition for a Jefferson Memorial in the District of Columbia merely states in the most general terms what is wanted, leaving the men who submit plans and drawings to use whatever residual freedom is provided by this "frame." Similarly, a prize essay on the general theme of "The Rights of Man in the World of 1940" is not unduly restrictive since it merely indicates the *direction* in which creative activity is to move.

Although designed for an entirely different purpose,[1] Figure 44 shows how different levels of creativity can be roughly detected regardless of the different degrees of skill in sketching. The subject (first-grader or adult) is instructed to draw anything he wishes in each square, provided only that his "picture" makes use of some of the lines given as a "starter" to the imagination. These simple stimuli later become part of some finished whole. They permit an unlimited number of possibilities since the material presented does

---

The information means of the "Utopians" in a test of current events (including history, economics, politics, etc.) was 47.66; of the "non-Utopians," 41.49.

[1] This material was supplied through the courtesy of Fräulein Dr. D. Trachtenberg who used it in her dissertation at Leipzig, 1935.

not point unambiguously to one, and only one, kind of drawing. The reader can easily convince himself of the universality of the creative function by duplicating these stimuli for the use of a few friends and noting the rarity of identical " solutions."

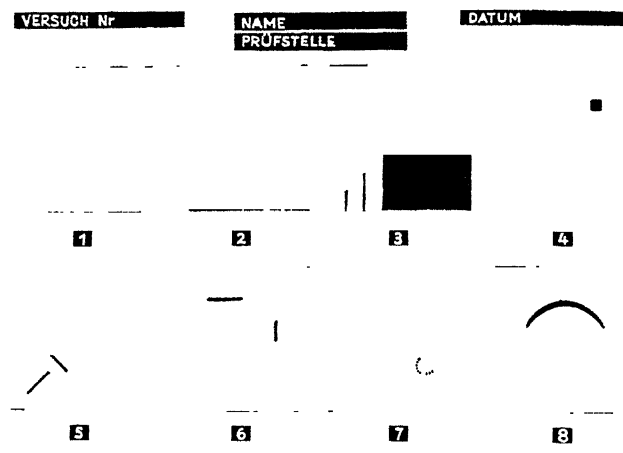



FIGURE 44

**Conditions furthering novel responses.** These considerations make it apparent that the way to boost one's originality is to provide conditions favorable to the emergence of the specific insight pattern which underlies every case of creativeness. A characteristically original act is seen in one architect's solution to his client's desire to have the rooms of his new dwelling on a corner lot filled with the maximum amount of sunshine from early morning to late evening — instead of placing the house on the lot in the conventional fashion with the sides of the house parallel to the street as in Figure 45*a*, he reoriented the structure in the fashion shown in *b*, thereby satisfying

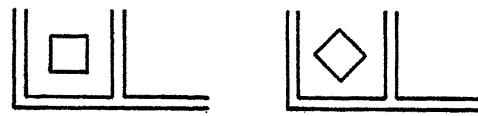



FIGURE 45

an understandable need for more light in an unconventional and daring way.[1] A prerequisite to this solution, however, was a simple perception of the daily course of the sun in this latitude seen in relation to the directional attributes and contour of the building lot. Here the particular creative act depended upon a vivid part-whole function, *viz.*, the dependence of the natural illumination of the home upon an orderly cosmic process. The restraints and inhibitions imposed by long usage and custom must frequently be surmounted before the new performance can actually be undertaken. One of the dangers of ordinary schooling is that it is so successful in discharging part of its task in establishing behavior norms that the maintenance of the plasticity required to transcend them on certain occasions is often impaired. For this reason the most thorough and exhaustive criticism of the *status quo* in any human enterprise seems to be a prior condition to effective innovational conduct. Such criticism has its own limitations if it merely ends with a specification of the inadequacies of the existent; it must proceed to the discovery and formulation of more satisfying objects and procedures. Classroom discussions and programs which repeatedly raise the question, "Could it be done better, and how?" are serviceable in creating an intellectual atmosphere in which original ideas may flourish.

The perception of necessary or causal relations which lies at the heart of the insight phenomenon begins in early infancy and expands to embrace a progressively wider field of experience. Thus, the preschool child has little difficulty in discerning that a curved cane is the best tool for pulling a ball out of one's reach toward one if a choice is to be made in terms of suitability from instruments such as those shown in Figure 46. The fit of the rounded edge of a ball into the correspondingly rounded lines of the curved "hoe" is appreciated with unusual directness, whereas the straight lines of the T figure

[1] Rotating the house upon a rigid central axis so that each current activity room receives the maximum of natural light is an even more daring innovation in the same vein. Many spectacular and entirely feasible ideas of this sort fail to be realized because of the simultaneous arousal of contrary values represented by "practicality."

evoke both mechanical and esthetic uncertainties. The provision of more curricular opportunities for identifying the *best* among a number of possible reactions sensitizes the organism to its own creative potentialities.



FIGURE 46

A sense of "must," "ought," and "right" about the grouping of items can be developed year by year with a variety of concrete materials. There is no reason why upper elementary pupils should not see that the very nature of our number system "compels" the sum of any two odd numbers to be even, the sum of any one odd and any one even number to be an odd, etc. Recognitions of this sort have an esthetic quality to them and lie dormant in a great variety of school experiences.

A progressive upward movement of insights from those of limited and special application to those of broad and inclusive meaning is the path by which the more impressive types of originality develop. If the world as we experience it always appeared in the same guise, the creative process could hardly occur because change and instability among inner and outer affairs are the factors which make originality possible. *Difference* is the key word and concept — a different external situation releases adaptive forces within the living system, and a different organic state likewise leads to modifications of the outside circumstances. Originality and creativity are simply special forms of adaptation which come about during this give-and-take between the creature and its milieu; the qualitative differences among these insights give teaching its warrant for seeking to push them into characteristically human or superior adult planes. As Woodworth says,

The relativity of insight must be acknowledged. The insight that suffices for a given problem may be inadequate when the problem is modified. . . . The child who discovers that the electric switch turns

on the light has adequate insight for that situation, but not for wiring a room. The electrician may have adequate insight for ordinary wiring problems but not for devising a new radio circuit. The electrical engineer may have adequate insight for all engineering problems, but not for the whole theory of electricity, and the physicists themselves with all their insight into the properties of the electrical field have not yet reached adequate insight for treating the electrical and gravitational fields under a single set of concepts, and they are now attempting by trial and error at the high level of mathematical physics to reach a solution of this great problem. No insight can safely be accepted as ultimate.[1]

## THE RELATION OF INTUITION TO THE CREATIVE PROCESS

The most significant part of the process of producing something new and different apparently arises through the use of a mental activity known as intuition. Historically this term has meant such varying things as comprehension, apprehension, perception, knowledge, understanding, belief, etc. In most of the modern discussions it has been used to refer to the more obscure and vague phases of thinking, and has usually been despised by the more hard-headed technical investigators because it seemed to be a fancy synonym for muddled thought. However, some of the recent developments in psychoanalysis, gestalt theory, and personality study generally assign to intuition a much greater importance than was formerly attributed to it. Intuition is viewed as a method, if not *the* method, for the preliminary assimilation of a complex situation marked by extensive "wholes" and "totals." Children respond "intuitively" to matters beyond their grasp, but they may nonetheless correctly appraise the experience so far as deriving its essential meaning is concerned. The alleged intuition of women is not a special sex trait but simply a mode of preanalytical or nonanalytical behavior that may statistically appear more often in them when persons or social relations are its primary content.

To react intuitively is not necessarily the same as reacting instinc-

[1] *Experimental Psychology*, New York, Henry Holt & Company, Inc., 1938, pp. 738–739.

tively — it is basically the method of awareness of the organism as a whole. This remark sounds poetic rather than strictly scientific (although there is no reason why the two should conflict), but one may say that intuition makes use of the entire personality as the organ of complete apprehension just as sight and hearing make use of more restricted sense organs for their own correspondingly more focalized experiences. We know that events which affect one sense organ influence the concurrent functioning of another; [1] why should not the stimuli affecting *all* the receptors unite to produce something quite different from that affecting just one? There is nothing "mystical" about intuition unless one wishes to call all suprasummative phenomena by that name. Intuition is a special unity, emergent, or gestalt synthesized out of the reports of the separate senses, but as different from them as a lyric is from the letters of the alphabet in which it is conveyed. There is little or nothing of serial inference or induction in intuition — it is simply a grouping of minor impressions into a superimpression, yet it is equally real and objective as a fact in our behavior.

This discussion of intuition belongs here because creative acts are largely intuitions that obtain expression in some medium. Intuitions in turn are often insights that arise not out of any deliberate problem-solving endeavor, but as spontaneous deposits of a variety of experiences. Feelings, memories, and perceptions sometimes organize themselves without any intent on the part of the person that one content rather than another shall arise. A meditative mood about the Universe or things in general or the meaning of life as a whole is usually the ground out of which philosophic intuitions arise. Similarly, passive contemplation about a more limited range of phenomena, without the intent to do more than get better acquainted with them or to organize them somehow, is the preparatory stage which creates those

[1] *Cf.* G. W. Hartmann, Changes in Visual Acuity through Simultaneous Stimulation of Other Sense Organs, *Journal of Experimental Psychology*, 1933, 16, 393–407. These intersensory effects are small, but real enough. Suprasensory (not transcendental!) effects must have an equally good organic basis.

insights and intuitions that either summarize and condense many happenings into a single thought or lead to new hypotheses, suggestions, and proposals for action respecting these events. It is regrettable that the hurried tempo of modern life, affecting as it does the school program which is too crowded to do all that is expected, is so inhospitable to the oldfashioned exercises of meditation and contemplation. A daily schedule that cannot find some time for this function of solitary absorption and reshaping of one's miscellaneous information, skills, and aims is an effective barrier to the emergence of many rewarding intuitions. It can be confused with a lazy introspective form of vegetation or with futile day dreaming, yet it is doubtful if any better method of getting the ground ready for creative performances can be devised. In these "idle hours" new conceptions are born or, more exactly, "conceived"; the rest of one's efforts are then directed to giving overt form and expression to that which has been imagined. Every important plan or achievement originates in this phase of intuition. The remainder is largely a matter of objectifying in technically competent style the dream or vision which first took form in the intuitive matrix.

## ANALYSIS OF A SAMPLE CREATION

Before the teacher can be particularly helpful to a student in lifting his activities to a higher creative level he needs to know something of the circumstances commonly surrounding the "manufacture" of a new production. Perhaps as useful an illustration as one can select is to be found in the facts connected with the origin of John Keats' "On First Looking into Chapman's Homer," often considered the finest sonnet in the English language. It is reproduced here because our discussion of it requires some reference to its content.

### On First Looking into Chapman's Homer

Much have I travell'd in the realms of gold,
And many goodly states and kingdoms seen;
Round many western islands have I been
Which bards in fealty to Apollo hold.

Oft of one wide expanse had I been told
That deep-brow'd Homer ruled as his demesne;
Yet did I never breathe its pure serene
Till I heard Chapman speak out loud and bold:
Then felt I like some watcher of the skies
When a new planet swims into his ken;
Or like stout Cortez when with eagle eyes
He star'd at the Pacific — and all his men
Look'd at each other with a wild surmise —
Silent, upon a peak in Darien.

As a young medical student, Keats was badly "miscast" for the physician's role; his ill health and his passionate literary and artistic interests would have given any vocational counselor today ample reason for rejecting this occupational solution to his need for economic independence. During his stay in London, Keats was accustomed to visiting the lodgings of some friends who shared his poetic enthusiasm. On one of these occasions these youthful romantics, steeped as they were in the classical lore of the educated Englishman of their day and increasingly sensitive to the antiquarian charm of Elizabethan writers, discovered a half-forgotten translation of the *Iliad* and *Odyssey* by John Chapman. They read portions of this vigorous epic material to each other during most of one of their nightly sessions. Keats apparently was deeply affected by some features of style, imagination, and composition which he had previously overlooked despite his familiarity with the Homeric legends. The group disbanded toward dawn; when one of his friends came down to breakfast there was the draft of the famous poem.

An exact reconstruction of the details of this incident can hardly be guaranteed, but this is not important for our purposes. Certain aspects, however, may be selected for emphasis, because they provide a clue to the controls of artistic creation. Keats had had a deeply emotional experience and he was impelled to be articulate about it. Had he been a musical composer, he might have expressed himself through tone; had he been a painter or a sculptor, the mediums peculiar to these crafts would have been his preferred vehicle. However, Keats was an expert in the use of language as an instrument for convey-

ing thought and feeling, and his subjects, *viz.*, Chapman and Homer, were also " weavers of words." Since Keats was better at writing than at singing, there is nothing startling in his selection of this mode of expression.

But why a sonnet rather than some other poetic form? Here we have no inkling of the causes operating to dictate his choice other than the compact and " formed " quality of the sonnet which permits the compression of the maximum of ideas in a minimum of closely knit rhythmic verbal organization. The structure of Keats' experience as a reader and listener that memorable night may in some way have resembled the pattern or design exhibited by the usual sonnet, *i.e.*, intense feeling centered about a highly concentrated stimulus rising to an impressive climax and leaving the person different from his earlier state.

We may also be sure from the figures of speech employed that the author had recently had his " eyes opened " with respect to a number of natural phenomena, particularly such timeless things as the sea and the sky. He possessed a certain amount of historical and scientific information from which he could draw similes wherever basic resemblances existed. What was learning the true nature of the Homeric spirit like? An astronomer scanning the heavens and finding a new planet; an explorer beholding for the first time a vast ocean — such was the " lift " of spirit approaching ecstasy which Keats probably felt and which he wanted to convey. He thought he knew Homer from his schoolboy lessons, but now some fresh insight had enriched his understanding far beyond what he had previously had. Where formerly he had been " told " of a certain domain, *i.e.*, knew of it only at second hand, now he was able to " breathe its pure serene," *i.e.*, appreciate the vitality of Homeric verse by direct and immediate experience.

This psychological episode in one sense is not unusual, for many individuals at one time or another have thought that they understood something until a deeper intuition appeared to make the earlier form of comprehension seem pale and feeble by comparison. The quality of poignancy, however, may still be missing and only an organism

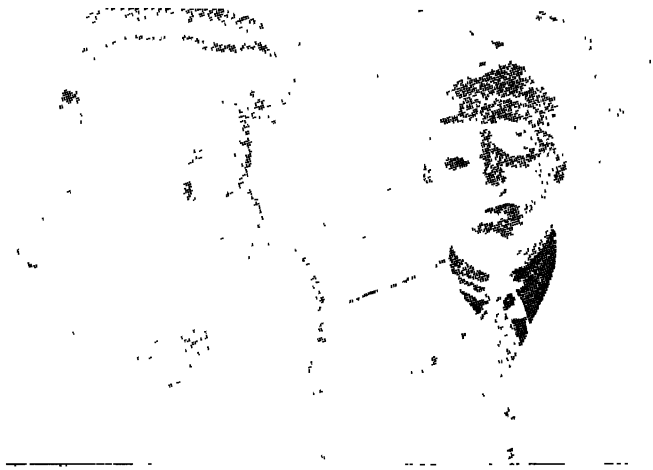
appropriately sensitive and outfitted with a suitable complement of expressive skills is able to tell the story. These necessary ingredients appear to have converged in the production of this distinguished sonnet, which even an actual historical error (however, the substitution of Cortez for Balboa may have been dictated by the demands of prosody) cannot mar. This fusion of essential elements from the past in a novel design is always present in the creative act. All things are in a state of readiness for the unifying " flash " that is merely the last stage in the process. This organizing stroke is not an " extra " added to the forces already present in the situation, but comes about largely because of the nearness and similarity of these forces themselves, just as a spark will connect two electrodes when they are close enough and when the difference in the respective charges is sufficiently great.

While there is a great gap in the quality of Keats' better poems and the less finished efforts of many children's verses, psychologically they are surprisingly alike. Elementary-school pupils are not usually interested in making long sustained poems, nor are they capable of the sharply defined organization required by a sonnet; their poetry touches briefly minor incidents of life and reflects simple moods. Esthetically, however, they rely as much upon metaphors as the experts, and the musicality of the sounds they select is often as high. The child who can make no more than a couplet that makes sense, displays an inner rhythm, and betrays some warmth of feeling is as truly original in his ways as a Milton elaborating the extensive cantos of *Paradise Lost*. Parallel claims can be made with equal justice where the juvenile efforts make use of other art forms.

Teachers can develop the creative possibilities of their pupils by frequently arranging for productions in miniature planned and executed by the learners themselves. The provision of superior models of performance in each art form together with active attempts to do something of one's own " like that " are means of fostering originality. The fears of blind imitativeness are usually groundless; obviously the most original person is not one who knows the least about what

others have done or who has never made an effort to absorb what he can from master specimens. On the contrary, wide acquaintance with superior and inferior performances is a prerequisite to the possession of a mature taste. Even the deliberate use of models has its advantages in furthering technical competence. No young scientist is hurt by trying to work in the manner of Faraday. Ben Franklin's prose was simplified and clarified by his intentional plan of "copying" the style of the *Spectator* papers. For A to try to think like Spinoza will not necessarily result in a lamentably smaller and inferior edition of Spinoza, but will generally help to make a better A and a better thinker. Personality growth is always aided by an ideal, no matter what field of human enterprise is involved.

**Advantages of a mental set for unusual similarities.** Specifically, all forms of creativity seem to be greatly dependent upon the recog-



Australian Kaola A. P. Herbert, British M. P.

FIGURE 47

Why is this combination funny?

nition and use of significant resemblances among highly diverse occurrences. Instruction for originality consequently needs to supply the pupil with a stock of experiences in which similes, analogies, func-

tional equivalences, and "common denominators" abound, plus ample encouragement in seeing parallels, noting likenesses of the most unsuspected sorts, and establishing similarities between anything and everything. Association by similarity is not of the same atomistic type that association between discrete items appears to be; instead, the resemblances *in toto* of extended wholes is crucial even though none of the separate parts may be alike. The humor in the photographic "juxtaposition" in Figure 47 rests exclusively upon this pattern reaction of the organism.

Even the simple device of keeping a record of resemblances and similarities that suggest themselves in fugitive moments promises to be helpful to the quest for greater originality. A blackboard lesson on "likenesses" and "homework" dealing with similarities have the advantage of establishing a mental set toward creativeness, even though these in themselves do little more than form the groundwork for the production of novelties. The reader could profitably extend the sample list here given.

| Situation A | Is Like Situation B (and Vice Versa) | A Relation Useful in |
|---|---|---|
| Pagoda | An evergreen with snow-covered branches | Poetry, architecture, painting |
| Boiled cauliflower in dish | Soft underpadding on cats' and dogs' feet | Dinner-table conversation? |
| Spiral nebula | Thumbprints | Universality of vortical forces |
| Satellite | Intra-atomic structures | Cosmic theory |
| etc. | | |

## STYLES IN ORIGINAL PRODUCTION

In tracing the course of a new performance from its faintest beginnings in some mild dissatisfaction with things as they are to the delivery of the finished product, it will be helpful if we make use of a schema first proposed and named by Graham Wallas in a publication which appeared in 1926.[1] After examining the descriptions of

[1] Graham Wallas, *The Art of Thought*, New York, Harcourt, Brace and Company, 1926.

their thought processes as reported by eminent mathematicians, scientists, technicians, inventors, and artists, and matching this with his own methods of research in the social sciences, Wallas believed he could distinguish four sequential stages common to all creative thought which he labeled, respectively, (1) preparation, (2) incubation, (3) illumination, and (4) verification. The subjective and objective phenomena associated with each of these stages have been described in slightly different ways by various observers, but they all agree in seeing a marked likeness between these processes and the ordinary course of insightful learning. This is to be expected on the basis of our discussion earlier in this chapter on the creative aspects of the problem-solving activity. No one can create anything without accepting a task or imposing it upon oneself, exhibiting some drive toward the implied goal, discovering essential relations, and expressing one's purposes in some objective form. These are also the features found in the usual types of learning and in every challenge to the critical or reflective capacity of the individual. The major contrasts center about variations in shading and emphasis, especially those concerned with the difference between assimilating notions already before one and groping one's way forward under the necessity of self-expression to the achievement of a fresh synthesis.

1. *Preparation* refers to the preliminary exploratory period of production during which the organism assembles those materials which it expects to use in the work that it has before it. The issue that the person faces is defined, restated, brought into relation with other presumably pertinent matters, and carried to the point where familiarity with the area is much greater than it was at the very start. A composer entrusted with the task of writing a new national anthem for America would probably collect the patriotic songs of all countries, examine them for their distinguishing characteristics, and inquire among fellow-musicians and the lay public why some anthems are better than others and what the desirable tonal properties of a superior one would be. Perhaps he would get as far as a recognition that the song he is to write must be (*a*) stirring emotionally, (*b*) vivid imagi-

nally, (*c*) designed so that all or most people can "carry the tune," (*d*) adapted to large audiences and situations, (*e*) suggest the dignity and majesty of a high ideal, (*f*) timeless in quality so that it will not be swiftly "dated," (*g*) expressive of the most characteristic spirit and temper of the nation's past, etc. To manage this preparation stage adequately, the composer might find it necessary to steep himself in historic lore, acquaint himself with the cultural likenesses and differences of an extensive country, and try to identify and isolate the aspirations of representative groups by such a concept as a "hymn to Democracy," "unity and freedom," etc.

2. *Incubation* is a more puzzling stage. It usually implies that some "unconscious work" or cerebration is done on a persisting difficulty even while one is occupied with other things, but it may involve nothing more than a rest period. If the task is a long-drawn-out one, the incubation phase necessarily intervenes because one has to be concerned with other life duties, even if these are no more serious than eating or sleeping. If the entire process is sharply telescoped, incubation as such may disappear; but in most extensive productions its chief function seems to be to restore the organism to a fresher and more zestful approach to the question that had earlier been carried to the point of fatigue or of ineffective work owing to other blockages which vanish with time. It is doubtful, too, if suggestions concerning the search are wholly absent from consciousness during the incubation period; one who is gripped by the idea is not likely to be able to banish it from his mind completely while it is still in an unfinished state.

3. *Illumination* is the brief but critical period when all the brain work earlier done on a problem crystallizes in a flash of extraordinarily rapid organization. The melody for which one has been searching now begins to take form, or, in another area of creativity, the ideas literally come faster than one can write them down. This is the moment — really, many moments, sometimes hours — of "inspiration" for which the individual has longed. But this illumination cannot occur without the prior activities of "preparation" and "in-

cubation" which make the system ready for this occasion. Fechner found his psychophysical formula on a sickbed, after he had literally soaked his brain with information about the body-mind question; Kekulé hit upon the benzene ring during the writing of a chemistry chapter which resisted easy composition and while in a dozy, fuzzy mental state from distaste for a boring job; and every schoolboy is familiar with the classical case of Archimedes shouting "Eureka!" in his bath. Illumination is a highly unpredictable process, but it does not take place without the proper setting provided by stages (1) and (2). That is why insights about physics usually come from physicists, musical themes from persons competent in this art, and astronomical theories from astronomers. In some matters the outsider may see things to which the insider has blinded himself by too close contact with the material, but more frequently the expert and the specialist achieve the illumination because their minds provide the best soil or ground in which it can arise.

4. *Verification* is a supplementary stage in scientific creation; in the plastic arts "revision" is a better term. Even the most vivid and convincing illumination may be deceptive, and it is only as one acts upon it that its strength and weakness are revealed. In art, this corresponds to the polishing stage — the initial rough design is smoothed and refined into the best possible form. In science and conduct of a "practical" sort, the illumination is not a final guide to action until objective tests and checks in the laboratory or in the field have confirmed its correctness. This is the heart of the experimental method. The best that illumination can do in scientific work is to provide a promising hypothesis or the outlines of a broad theory, the continued worth of which depends upon the outcomes of further inquiry into their correspondence with a wider sample of observed realities.

**Practical pedagogical consequences.** Patrick's interesting inquiries among poets and artists strongly support the Helmholtz-Wallas view that this four-stage creative process is typical of all novel intellectual products. The reports of workers in these areas indicate that this

pattern is the one they normally find occurring in themselves, but even more significantly these appeared in an actual experimental situation. The experimenter placed a picture before a group of professional or admittedly competent poets and a control group of intelligent nonpoet adults, and required them to compose a lyric poem on the basis of the suggested stimulus. A poem was similarly used as a "theme" for a drawing for the artists and nonartists. The subjects talked aloud as they worked so that the experimenter could follow the various stages of work as seen by the subject. Analysis of the records indicated that the general course of creative thought was surprisingly alike in both the lay and the expert groups, despite the customary esthetic inferiority of the productions of the control subjects. Some of the nonartists turned in better performances than the experts when these were subjected to jury ratings, an overlap not expected in areas where high skill is involved. These are facts of major educational significance. Contrary to the common assumption that the artist cannot work under pressure or while he is being watched, the products made under these presumably hampering conditions were often of such merit that they could be published or sold. The Patrick researches [1] strongly support the claim of progressive education that creative activity can be done in a measure by everyone and that it is not a form of behavior sharply limited to the top one-tenth of one per cent.

The social and personal value of the product — a theory, an experimental report, a story, a clay model, a plan for institutional reorganization, etc. — will probably differ enormously, but even there we are on most uncertain ground. The pleasure evoked by a clever adolescent's essay when read before his classmates may far exceed the satisfactions derived from a term's study of *Silas Marner;* and the contribution made to an individual's happiness by a simple textbook introducing him to a new field of thought and activity may be much greater than that made by a classic he fails to understand. All creations are potentially useful, and nothing hurts the effort to be original

[1] C. Patrick, *Creative Thought in Poets,* New York, Archives of Psychology, No. 178, 1935.

more than the pervasive but unwarranted opinion that only a handful of persons in a century can accomplish anything of this sort. Actually, the upper fifth of those papers rejected by any editorial jury contains a large fraction of performances distinctly better than the bottom fifth of those accepted. The best poems of a national group of undergraduates today are not much, if at all, inferior to the poorest products of the greatest figures of all time. Educational psychology alone cannot supply the proper standards for appraising any novel accomplishment, but it can do much to reduce the fears of teachers and pupils that their creative functions are absent or negligible by acquainting them with the conditions under which they flourish. Original production is an area of human experience from which few, if any, persons are permanently debarred.

## SUMMARY

Psychologists looking over the educational scene at all levels, but particularly focusing their gaze upon the principal stretch of the school system between the kindergarten and the graduate school, have grown more and more convinced that the processes of "acquisition, impression, intake, and learning" have tended to dominate over those concerned with "production, expression, output, and creation."[1] With the possible exception of the doctoral dissertation which must be "an original contribution to knowledge" and the interest of certain technical and professional schools in equipping their students to handle novel situations, formal education is heavily overweighted on the side of absorption and gravely unbalanced on the side of self-planned performance. This is a rejection of the lesson presumably given by the structure of the organism itself which maintains a better equilibrium between the receptor and the effector segments of the living system (*cf.* Chapter 3 on this point again).

A creative act appears whenever a planning, designing, and constructive series of events occurs of which the organism is the initiator and controlling participant. It is the highest and most distinctive

[1] These quoted phrases form the gist of J. M. Fletcher's volume on *Psychology in Education*, Garden City, N. Y., Doubleday, Doran & Company, Inc., 1934.

form of purposive behavior. Creativity is like problem solving in that it involves a search for a solution to some " disturbance " felt by the living system, but it differs slightly from the usual type of reflective thinking in that the organism deliberately creates problems of a certain kind for it to solve instead of merely adjusting to those that it inevitably encounters in the course of its career. An esthetic quality therefore attaches to all creative behavior and provides the principal satisfactions that the individual derives from it. Originality is a special type of insight, distinguished less by any peculiar patterning of the response from a neural or behavioral viewpoint than by such criteria as the unprecedented nature of the performance and its utter uniqueness.

The notion of " form " or organization is central to any discussion of the creative process; *i.e.*, " How shall my responses be *shaped?* " is the chief question that must be answered. The underlying mood or idea can be transmitted to others by many different channels — through the dance, the written or spoken word, the colors on canvas, the molded outlines of a statue, the façade of a great building, the sounds of many instruments — for these are simply the external media which must be mastered largely by the ordinary processes of acquiring motor skills (see the appropriate section in Chapter 10). Integration is the most conspicuous mental process occurring during creation; it alone accounts for the basic theme, and the endless variety of novel forms which emerge can only be explained by this principle. Integration itself depends largely upon certain structural resemblances and similarities between the experiences that it unifies. A mind alert to unsuspected likenesses is a mind equipped with something indispensable to independent creations.

A number of empirical researches have made it apparent that most creative acts have a fourfold structure: preparation, incubation, illumination, and verification. This is the way artists, scientists, craftsmen, and all those who cannot work by the methods of stereotyping succeed in producing their achievements. Illumination is the heart of this process, and it too, like so much of our behavior, can be subsumed under the more comprehensive psychological heading of in-

sight formation, with which we are already acquainted. This stage is not inherently the mental monopoly of a productive élite, but realizable wherever the experiences and methods that favor its appearance are properly combined, and particularly wherever a strong drive in this direction is awakened.

The type of behavior considered in this chapter can be furthered by a reorientation of school programs and classroom methodology. (1) More emphasis and opportunity throughout the years of growth must be given to originality and creativity. (2) The pressure of ordinary routine must be relaxed to allow more free time for general meditation about one's purposes and the meaning of the miscellaneous experiences that have accumulated. (3) Expressive skill in at least one major technique must be carried far enough so that it becomes a suitable vehicle for one's ideas. (4) Close "imitative" study of good models in the area of one's interest is helpful rather than hurtful to originality of performance. (5) Pupils should be encouraged to be articulate about their whimsies and fancies, for many of the most fruitful suggestions arise in this apparently undisciplined way. (6) The meaning of integration and unity may be developed by the establishment of a mental set to look for similarities between the most diverse phenomena. There are other ways of promoting the appearance of "hunches," but these are some of the more important, because they are among the more neglected, at the present time.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Perform this minor experiment upon as large a group of subjects as you can conveniently assemble: Present the first pair of nonsense drawings to your audience and ask them to indicate which nonsense names are the more suitable for each "figure."

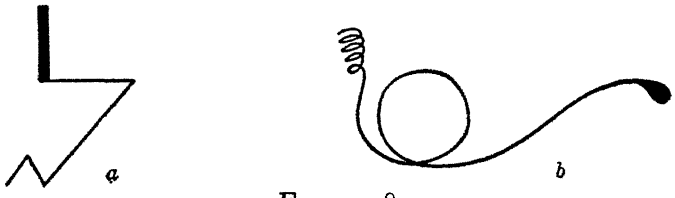



FIGURE 48
Rulam or Kadek?

Repeat the test with the combination shown in Fig. 49.

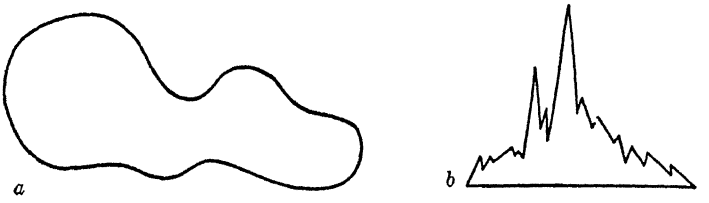



FIGURE 49
Peeweetee or Mahloona?

What explanation can you give for the high measure of agreement concerning the best "affinity" which this experiment reveals? What significance does this phenomenon have in the intentional development of original thought? [1]

2. Identify the person among your acquaintances who, in your judgment, possesses the most original mind. How is this originality manifested and with what personality attributes is it associated?
3. Set yourself the task of producing something altogether new — a poem, a painting, a musical composition, a building plan, or anything less pretentious so long as it is genuinely creative — and then describe the objective and subjective events that occur from the very beginning to the end of the work. How does this situation as you directly experience it harmonize with the account in the present chapter?
4. What are the consequences of seeing a thing not as it now *is*, but as it is *becoming*?
5. Name the most important single thing that your present and past teachers could have done to increase your creative capacity?
6. Does the school system as you know it spend a disproportionate amount of time and emphasis upon the absorptive functions of the intellect to the disadvantage of the expressive functions? What general reorganization (administrative, curricular, etc.) would you introduce to redress the balance?
7. Take some distinguished creative performance in art, science, or any other field so long as it appears to you to be original and

[1] Figure 48 is found on p. 117 of David Lindsay Watson's *Scientists Are Human*, London, Watts, 1938; Figure 49 I trace to a Berlin lecture by Wolfgang Köhler.

admirable and describe consecutively the steps by which it came into being and the circumstances surrounding its production. This may require some historical and biographical browsing. A good model of the sort of thing you might try to duplicate is J. Middleton Murry's article, "When Keats Discovered Homer," in the *Bookman*, 1928, 68, 391–401, a paper to which the discussion in this chapter owes much.

# Chapter 12

# THE IMPROVEMENT OF CHARACTER AND PERSONALITY

Some problems in educational psychology are best presented in terms of representative case histories. The case method in this field consists in the preparation and use of clinical biographies, primarily as a means of facilitating individual adaptation but also as a "longitudinal" device for assembling and organizing the important developmental occasions in a person's life in testing some theoretical position. A well-chosen case study is useful as a concrete illustration of certain psychological principles and as a means of "humanizing" some abstract conceptions. This device is particularly valuable in connection with the issues raised by the content of the present chapter.

## SAMPLE CASES AND THEIR TREATMENT

CASE I. Grace Hutchins, age 10, 5th grade. IQ tested at somewhere between 126 and 138 during the last seven years. Tall and heavy for her age, only one or two boys in her classes larger than she. Excellent health and moderately attractive but awkward in most sports except swimming which she does better than most. Best singer in her grade. School work uniformly good, but not at the very top in any subject. Favorable attitude toward school; disposed to co-operate with teachers, but a bit bossy and overfrank with her playmates. This last constitutes her chief adjustment problem: She wants to be popular but her close friends are few. Her chief frustration is failure to be elected to leading offices, although the class once made her its treasurer and she managed a home-room tea party in good style. Grace is puzzled by this and envies her successful competitors. She

is generous and not fundamentally unkind to others, but does not see that her dominant and impatient bearing toward others makes them uncomfortable and slightly resentful. She entertains them and brings occasional gifts in an effort to win their good favor, but a chronic social irritability nonetheless persists. Grace does not understand that she is objectively more fortunate and successful than most pupils and that her chief difficulty is traceable to an overambitious set of standards. Her independent and critical thinking is an asset in ordinary school work, but her use of it with persons apparently runs counter to her desire to have people like her and to give evidence of this esteem in the way she wishes. Grace's personality assets are many, and her liabilities few but concentrated in an area where they reduce her happiness below what it might be were she to develop sufficient skill in handling others.

CASE II. Fred Arkwright, age 14, 6th grade. IQ varies from 105 to 112, but he has been "left back" twice, frequently plays "hooky," and is considered a "likeable scamp" by his teachers. His older brother was a brilliant student and the contrast puzzles those who know the two boys but the situation leaves Fred smilingly unaffected. He is a strong outdoor youngster, fond of pet dogs, hunting, fishing, and general physical activity. Books do not interest him and he thinks that only "sissies" care for school. He refuses to go near girls except to tease them. He is shrewd in personal affairs and never gets into trouble unless fist fights with other boys be considered such. Fred is a happy, pleasant companion, despite his poor school record and a tendency for his parents to apologize for his apparent aimless existence. He expects to work when he grows up, but has no idea at what he will earn his living and is not seriously concerned about that. He is enthusiastic about Boy Scout meetings, but doesn't understand why his troop meets in a church basement. Fred's "assets" are his robust healthy-mindedness and his skill with tools and objects rather than with words and ideas. He thinks of himself as "dumb" and accepts the suggestion implied in his school marks; he is waiting for the time when he will be free to roam about in the outside world as he likes. He is silently jealous of his older brother's mysterious competence in speech and writing which brings to him so much social approval and will boast to others about his big brother's skill in these matters even though he himself has more appreciation of athletic prowess. Fred's chief adjustment problem is a refusal to take seriously the things that the adults in his environment prize; their values

are not his. They think of him as a " perpetual boy," seriously lacking in ambition. Fred reacts by emphasizing in his behavior the importance of fun and a good time, and is in no hurry to grow up.

**A new emphasis in teaching.** These two authentic cases are sketched too briefly to give more than a rough picture of the kind of pupil analysis which every teacher should be equipped to make. It is an indispensable preliminary to all attempts to reshape the child's conduct. There is a saying to the effect that " to understand all is to forgive all " and there is no doubt that a condemning viewpoint can rarely be maintained by those who have penetrated to the bottom of another's personality make-up. Effective guidance cannot be done without full information about a person's past as this pertains to his present problems of adaptation; it also requires some conception of good and poor adjustments or one can hardly foster the former and correct the latter; but it can never be built upon an attitude of hostility in the counselor. In order to assist in the betterment of another's character and personality, the educator must see the person himself as intrinsically valuable regardless of the many serious defects he may exhibit at the moment. An attitude of complete rejection, *i.e.*, hate of others, is fatal to any constructive pedagogical labor with them. Not only do the pupils quickly sense this hostility — they tend also to respond in kind. The teacher must honestly be able to say, " I like you in spite of your defects," before his efforts at personality reconstruction begin to make sense.[1] Ethical decency and psychological wisdom both combine to urge the same general approach to what is broadly termed the guidance function of the schools, and this fact in itself is of the greatest importance to educational theory and practice.

Whether they wish to assume this role or not, all teachers are placed in the position of serving as amateur psychotherapists; the " amateur " here should mean not " inexpert " but merely " nonprofessional." The therapy of education is found in making the poor

[1] According to one scholastic wit, guidance is best defined as seeing through Johnny and then seeing Johnny through! But one of the worst " vices " is unchecked ad-vice!

personality better and in making the good personality still better. This mental-hygiene emphasis is not sheer sentimentality, for it is unfortunately true that the injudicious operation of the school system may stunt and misshape personalities as well as build them. The dunce-cap technique of the early American school was a form of refined cruelty that marred and warped some children for life. Per contra, the extension of the elective system of studies downward from the colleges, while undoubtedly mixed in its effects, has certainly helped the student "find himself" by eliminating the repressions of a "must" curriculum. Making the performance primary and the performer secondary is the source of much, if not most, of the personality maladjustments actively created by the school. For this there is but one corrective — the restoration of the individual to his rightful central place in the entire learning program.

It is all but certain that a shift in emphasis from exclusive devotion to subject-matter elaboration, divorced from its vital linkage with the direction of the learner's ambitions, to a personality-centered program will do much to restore vigor and poignancy to our educational experiences. Knowledge was made for man, not man for knowledge. The more every instructor labors to locate his contributions in the place available for them in the mental structure of his pupils, the more successful will he be both in promoting their general adaptation to the culture of the period and their favorable response to the intellectual domain over which he presides. It is also probable that this is the best technique for furthering the reconstruction of the culture itself, since the learners will have had demonstrated in their own personalities the significance of integration as a central aim of all teaching and learning activities. Partial, restricted, and ephemeral forms of integration will not do; nothing short of a true internal harmony evoked by compatible and coherent values and by an appropriate adaptation of means to ends will produce healthy societies and healthy personalities.

In the establishment of an integrated and acceptable pattern of conduct, each individual needs some final and overarching principle

to which he can repair when confronted with the shifting uncertainties of concrete experience. For many persons, religion says the last word; to other minds, devotion to some grand cause quickens all the minor loyalties of daily life; among intelligent undergraduates, democracy and science, both as objectives and as methods, serve the function of co-ordinating the numerous fragmentary episodes of a collegiate career. Perhaps more than any other rivals, these two conceptions convey the essence of the enlightenment of the twentieth century.

## THE "THEME-SONG" CONCEPTION OF PERSONALITY

It is hard, if not impossible, to improve that which we do not understand. This principle is peculiarly true in the field of character education where *self*-improvement in accordance with the person's "set" is the only kind that seems to last. From this derives the importance of knowing first what is there before attempting to alter it.

In this volume no distinction between character and personality will be made, for it is the writer's conviction that a superior personality is also a superior character and that the term "personality" contains all that "character" connotes. A moral quality surrounds the word "character" and an esthetic one the word "personality"; constitutional factors like "temperament" are occasionally assigned to the latter and social ones to the former. However, the systematic interactionist position we have hitherto adopted is not helped by a dubious distinction: Anything that builds character builds personality, and vice versa, for the two refer to the same general aspects of behavior.

In strictly professional discussions the term lacks all honorific overtones. A criminal may have a repulsive and distorted personality; an imbecile may have an uninteresting one; a fascinating conversationalist may have an animated personality — but they all reveal a general pattern that characterizes their total behavior. This integrated organization of all the pervasive characteristics of an individual as it manifests itself in focal distinctness to others is the phenomenon of personality.

Whenever one is responding to the *uniqueness* of the organism, one is dealing with it in a way that involves an emphasis upon personality. Teaching requires that this authentically unique nature of each pupil be comprehended and considered at every stage of the instructional process. To deal with students as so many bodies occupying assigned seats, using their names or numbers solely as a means of identifying certain examination papers, is a way of "washing out" the uniqueness of each learner. Each teacher needs to be sufficiently acquainted with each pupil so that the "pattern" of the learner's life is plain to him. Every person has, so to speak, his private "theme song" which distinguishes him in everything he says and does and which recurs in the most unexpected forms of behavior.

It may seem odd to place so much emphasis upon the teacher's discovery of each pupil's life *theme*, but we have the best of reasons for believing that without this insight, the child's personality remains unknown. One theme cannot be substituted for another (rather, made to grow from it) without a fair picture of the theme already in possession of the organism. Personality reconstruction is exactly what that phrase implies — it is not a "patch" here and a patch there, but a rearrangement of the general structure of thought and action. Compared to the adult, the child is relatively unformed — and yet he is far from formless.

**Utilization of the idea.** The predicament of the girl described in Case I makes sense as soon as one sees that she is suffering from what the Germans call a "success psychosis," *i.e.*, a condition created by her previous good fortune so that she is now dissatisfied unless she is acknowledged as the leader or at least as the second best in most of the important activities of her age group. Although barely in her teens, she has already formulated for herself, perhaps unwittingly, this control of her conduct, "Make good; be at the top in all you do." The competitive atmosphere of contemporary American culture is clearly responsible for this theme, for all that Grace has done so far is to absorb the prevailing ideals of her environment. Unfortunately, it did not provide her with a set of techniques to go with this regulating

goal; the basic theme of her present life thus explains her discontent and indicates the therapy to be employed. The easiest correction to make would probably leave the theme itself untouched (since it harmonizes so well with the temper of most student leaders and, save for its partial unrealism, is not wholly unadmirable) and to supply the girl with opportunities to develop into a "practical politician," acquainting her with "electioneering" tactics, and in general subjecting her to a suitable program of "how to win friends and influence people." This is her obvious need, and while some of her minor habits stand in the way of fluent social management, the motivation to substitute a set more suitable to her "theme" is very strong.

A harder correction would be to attempt a modification of the basic life theme itself. The girl's desire to excel would be focused within a few areas and she would abandon her slightly neurotic and literally impossible attempt to be among the best in everything. She would be encouraged to maintain the highest standards of achievement in the fields that mean most to her and to accept gracefully a mediocre or even a somewhat inferior position in other respects. Her present craving for all-around leadership would be shown for what it is — an unhealthy exaggeration of a normal impulse. Which of these procedures is adopted should depend in part upon the choice made by the pupil as soon as he is aware what the true alternatives are, and in part upon the counselor's own feeling of which would make in the long run for the better total adjustment. Sometimes, as in the case here described, the best adaptation can be secured by a judicious combination of both techniques.

The key to a person's life sometimes appears not only in the role that he actually plays, but also in the role in which he would like to be cast. Thus a group of young adults were once confiding to each other the name of some historic character whose life they would rather live than their own. One man of strong philosophic and sociopolitical interests declared that if he could not be himself, Marcus Aurelius was the one individual he would want most to be like. Several others in the company gave expression to their preferences un-

til there came the turn of a modest young woman who was the recent wife of the young philosopher. Upon being asked whose part she would prefer to act, she answered, to the intense delight of the audience, "Mrs. Marcus Aurelius." Her satisfaction with the wife role was so complete that if her husband shifted his nature, she too wished to change hers in corresponding fashion so that the same essential relation would be preserved. Plainly the *leitmotiv* of her life was to be an affectionate and devoted helpmate to the man she admired; all other choices were made subordinate to this primary guiding principle of her life.

In a lesser but equally real way, children state their preferred roles in terms suitable to their age and the special experiences they have had. A group of 6th-grade parochial pupils were asked to indicate "the things you would most wish to be like if you could be born over again." Here are some of the replies:

A man.
An angel.
Happy.
Just what I am now.
King Arthur.
Like a princess.
Pretty.
To be a better boy.
To be a little blondie.
To be a saint.
To be someone who lived 20 years ago.
To be the child of a king.
To be very smart.
To be wise.
To lead a holy life.
To look more like a boy than I do now.
Wouldn't like to be born again.

The sources of these ideas are to be found partly in the religious culture to which these children were exposed as members of Catholic families, partly in the stories they read as part of their school work, and partly in the personality deprivations of which they had become

conscious in ordinary "lay" affairs. Missing something in their own natures, they proceeded to make the implied "correction" of themselves by stating it in the form of some desired condition.

## THE DEVELOPMENT OF IDEALS

Character education is not successful until the learner becomes an advocate and embodiment of certain major ideals. A personality without ideals is conceivable but empirically never encountered, for in those unfortunate instances where an individual seems to be living without ideals the probabilities are that the judge is confusing his own ideals with the whole range of possible human ideals. *An ideal psychologically is a concept that exercises a positive control over conduct, e.g.,* "democracy" may be correctly understood by a nondemocrat or an antidemocrat, but only a vigorous democrat accepts it as an ideal, *i.e.,* as a carrier of positive values for the organism. Similar ideals are conveyed by such terms as "scholarship," "kindness," "accuracy," and other words of broader and narrower meaning.

The growth of an ideal follows the same course as any other generalization or broad principle. The genesis of the notion of "justice" and its elaboration and application to progressively wider fields is representative of the evolution of any ideal. The very small child may begin to differentiate his feeling of "injustice" on the occasion when he is hurt by receiving less of something he wants than another youngster receives. If he gets a piece of cake exactly the size of that given his brother or sister he is mollified by the mathematical equality involved, although he may still wish to have a larger share for himself. Much later he may perceive that it is not strictly "equitable" to supply a large hungry person with precisely the same amount of food as a small satiated individual, and that true justice demands more than a rigid likeness in treatment. The elementary-school child has a strong sense that it is unjust to punish someone for something he has not done (or to be rewarded for something he has not done) and that the punishment should fit the offense and be graded in proportion to the severity of the offense. The "general" char-

acter of the response is emphasized more and more — the term "just" is applied to this act and to that much as the word "red" is used to designate a miscellaneous class of reddish things. The adolescent, if sensitive to social issues, tends to be impressed with the many "injustices" he witnesses and knows about and looks upon the establishment of "justice" in all affairs as necessary, desirable, and possible for his own and others' welfare. If he is a superior college student and studies Plato's *Republic* appreciatively, he may discover that justice is not merely "giving every man his due" but that it is a pervasive quality of the well-ordered State, *i.e.*, the *good society* in which everyone is in his place and there is a place for everyone. As the concept widens from a directly personal experience to an inclusive abstract notion, the emotional overtones which formerly were limited to the immediate case also spread to embrace all "similar" situations.

An ideal, like all mental processes, has not only a cognitive and affective component but also a motor or action factor. What is called a "weak" ideal is merely one with limited power to control behavior. One high-school boy while reading Bullfinch's *Age of Fable* was fascinated by the magnificent physical development of the Greek heroes represented in the photographic illustrations of classical paintings and sculpture. A vivid visual picture of the godlike body was established in his imagery and led him to improve his posture, to engage in more vigorous muscular exercise than hitherto, and to do everything in his power to make his own undeveloped physique approach that of the fine figures that he had admired. In this effort he was surprisingly successful, for within a year or two his own frame could rightly be considered an approximation to the Hellenic ideal. The suggestion of health, strength, and beauty contained in these inanimate forms was so powerful that it achieved a permanent control over this youth's bodily hygiene.

An instance of this sort reveals the true function of an ideal in behavior. It is often wrongly assumed that an ideal is useless unless it is attained, when as a matter of fact the chief service of an ideal is to energize action toward one or more goals. Ideals may or may not be

realized, but they usually help to bring the organism nearer its specific objectives and contribute greatly to the preservation of morale during the attempt.

Pedagogically, too great stress can hardly be laid upon the acquisition of ideals. They play the same part in character education that an understanding of principles plays in purely intellectual development; they are to be contrasted to restricted overt habits just as principles may be contrasted with isolated facts that exemplify them. An individual who has accepted the ideal of courtesy as a guide to his own conduct is rarely at a loss to know how to do the polite thing even in a culture with diametrically opposed practices or ceremonial manners on specific occasions. Such behavior, Allport says, reveals a *trait, i.e.,* a general pattern of response that characterizes everything a person does; it is not to be confused with the external " instruments " through which it operates.

**Sources and control of ideals.** The channels through which pupils acquire their ideals are numerous, but their general nature is readily indicated. Reading is obviously one major source, a fact which makes the quality of the books available to the pupil a matter of grave importance. The successful generals and soldiers of history texts have usually received an inordinate amount of admiration, although just what is commendable about persons who exercise the power of life or death over their fellows is hard to see. The stimuli provided by every medium of communication may all contribute to the establishment of a specific ideal: Movies show the adolescent how to make love, radio programs how to talk and sing, and newspapers which public figures are worthy of emulation. Teachers themselves provide many pupils with a personal ideal in action. The home may foster ideals of cleanliness and orderliness, and shape the growing personality in many less apparent ways. The church makes its contribution either by providing a universal sanction for all that other institutions offer or by emphasizing specifically religious heroes and the key virtue of saintliness.

A question of serious concern to educational psychology is the

existence of conflicting and contradictory ideals which stand in the way of the unification of pupil behavior in a fully integrated fashion. The dangerous phenomenon of the "split personality" comes about when incompatible loyalties are aroused in roughly equal strength. For example, it is not uncommon to find a boy who is dominated by an ideal of honesty and straightforwardness in personal relations, but who is also proud of his faithfulness to the other members of his gang. If an occasion should arise when his elders want to know which boy is guilty of some misdemeanor, the lad is placed in an uncomfortable predicament, for no matter which ideal he follows to the temporary disadvantage of the other he is sure to create distress. If the elders can satisfy themselves that this clash of ideals is present they would be wise to drop the search for incriminating testimony and leave to the boy and his associates the problem of dealing suitably with their recreant member.

Another adjustment problem created by ideals is found in the appearance of cynicism among intelligent youths when they find their ideals unappreciated by the rest of mankind and consequently debarred from easy fulfillment. A cynical mood is on the whole hurtful to the personality for it represents a drop in aspiration level to a plane well below that on which effective action could occur. The cynic is the disappointed idealist and the wounds from which he suffers are psychic trauma of a severe sort. The therapeutic insight that he needs to develop is that his ideals, if they survive critical reexamination, are as valid as ever, but that he needs to better his technique for achieving them. From cynicism to the "don't care" reaction of indifferentism is but a small step and personality deterioration rather than improvement is thus created. The loss of one's ideals is a tragic event and every counseling effort to secure their transformation rather than their abandonment ought to be made.

### BELIEFS AND ATTITUDES AS EDUCATIONAL PRODUCTS

The opinions that a pupil develops in the course of his schooling are an important part of the personality and character he ultimately

reveals. For a high-school student to reach the conviction that "Jews are a menace to the integrity of American ideals" is a pathetic and dangerous consequence of unfortunate formative influences. For him also to believe that "Negroes receive as much educational opportunity as they deserve" is an indication that his personality has been warped by the intrusion of a bitter race prejudice which will seriously affect his relations to two important groups in our national life. If in addition he is persuaded that "aliens who criticize our national institutions should be deported immediately," it is clear that a general attitude of intolerance and an accompanying disregard for truth and fair play have been established. Unenlightened attitudes of this type are probably seldom fostered by the school as such, but if it is concerned with the betterment of individual character, it must introduce a set of beneficial attitudes to act as correctives for those clearly detrimental to the pupil's best growth.

An attitude is normally a by-product of other activities and is rarely made although it ought to be the center of attention in school affairs. It grows out of every learning situation as a kind of incidental or concomitant result of the primary learning. Thus, if the work of the classroom touches upon the story of John Brown's raid on Harper's Ferry on the eve of the Civil War it is next to impossible to learn about this incident without acquiring some like or dislike for (1) John Brown himself, for (2) the use of armed force in behalf of a noble cause, and for (3) the activities of Northern abolitionists in dealing with the issue of slavery in the Southern states. Information alone is not the sole consequence of a unit of instruction in this area, for lasting viewpoints about events and personalities are also created, usually not deliberately but as an inescapable consequence of the "tone" of the occasion. The *spread* of the feelings thus engendered may be extremely wide — they may contribute to a distaste or interest in all kinds of history because it is history and not some other subject matter, to a nationalistic sense of identification with the past of one's own country, to a spirit of hostility or friendliness to teachers or school work in general, etc.

In every attitude one recognizes a *readiness to respond.* This quality and incipient motor reaction is often disguised but a little analysis ordinarily reveals its presence. If a junior-high-school boy believes that Sunday School is a place where pleasant fables are told but nothing really important to him or to anyone else ever happens, then his preparation to react negatively to a suggestion that he go there is very far advanced. An attitude steers one toward or away from certain types of experiences contained in the " content " of the attitude, *i.e.*, the things referred to as attitude objects. If a secondary-school pupil can honestly mark a *plus* beside the statement, " Boys and girls of high-school age should never drink any alcoholic beverages," he is attuned to rejecting an invitation to a friendly glass whereas the individual who marks it *minus* is probably in a state of readiness to accept such an offer. Attitudes generally are forms of behavior which increase the probability of some future behavior occurring and decrease it for other forms. In this respect they are like all learned responses, distinguished mainly by the dominance of this " preparation to act " function which is less conspicuous in other types of modified behavior.[1]

**Ways in which different attitudes arise.** How are attitudes established? They arise primarily because all learning is *multiple* in nature, *i.e.*, our responses to any stimulus situation make use of many aspects of our psychophysical equipment instead of being limited just to the specific mental process that is in control of the system at the moment. A teacher reading the Gettysburg address to his class is not giving his pupils a simple exercise in listening — the rhythmic prose of that extraordinary speech constitutes a veritable hymn of democracy that could justly be intoned to the accompaniment of

[1] This " readiness-to-respond " theory of attitudes is not a speculative matter for it has been experimentally confirmed by precise measures of the time taken to react to words that awaken different attitudes. Thus, Cantril found that a person with a general set toward religious experiences reacted more swiftly to such words as " prayer," " psalm," " immortal," etc., than individuals with an anti- or nonreligious orientation. *Cf.* General and Specific Attitudes, *Psychological Monographs*, 1932, 42, No. 192.

organ music. The deep feelings latent in these lines are so easily communicated that even an inexpert voice can count on the prior associations surrounding Lincoln and the dark days of 1863 to bring tears to the eyes of the audience. Plainly the whole organism is responding and not merely the auditory centers of the brain.

A converse illustration must also be given to indicate how vital this fact of multiple response is to the educative process. One bright 10th-grade boy was told to go to the blackboard and give the proof of a certain geometrical theorem. He wrote the steps involved with better than ordinary neatness, but did not give a logically rigid demonstration of the proposition. The instructor remarked, perhaps unintentionally, "I'm afraid you confused this class with the one in penmanship." This boy traces his unfavorable attitude to all mathematics (later manifested in college) to the shame and humiliation created when he was in an exposed position before his own age group. The passing satisfaction which the teacher may have derived from a minor piece of "wise-cracking" is petty in amount compared to the lasting harm done to the learner in developing ill-will toward a certain important field of scholarship. If students are made unhappy by their school work, some radical revision of the techniques of classroom management must be undertaken.

Although the genesis of definite attitudes can be traced to many fugitive sources, there are some common conditions with which every educator must be familiar. These may be given serially without necessarily implying any order of importance:

1. Knowledge of the relation of one's attitudes to others serves to change them, usually in the direction of majority opinion. Statistically, most persons feel uncomfortable to be identified with a minority unless that minority is a group with favored status such as an honor society. A sense of insecurity is aroused when an individual finds himself outvoted on a particular issue, the intensity of this insecurity feeling being roughly proportional to the size of the discrepancy between the majority-minority strength. Discussion, added information, and altered external circumstances may turn a

minority opinion into a majority judgment — a procedure essential to what is termed "social progress." To stand out against the crowd is harder for children than for adults because older persons can find support for their attitudes in sources beyond the immediate situation. To have one's own attitude confirmed by a majority of one's fellows is distinctly pleasurable — it is in fact a species of reward. Hence the strong vector in that direction. To find one's attitude resisted or denied by others is, on the contrary, a form of punishment. This combination of a push from behind and a pull in front explains why attitudes so commonly assume a mass character with the individual's opinion merely a personal illustration of their presence. More resistance to majority opinion should be encouraged if for no other reason than the historical and statistical fact that the majority is often wrong on critical issues. The discovery that one holds a minority or unpopular view should be an incentive to re-examine one's position and the case for the majority afresh; if the new appraisal leads to a reaffirmation of the original position, it may mean that the pressure of the group is not strong enough to outweigh the compulsions produced by the facts and opinions known or appreciated by the minority exclusively. The possibility that one person may be right and all the others wrong is sufficient to justify what is often facetiously called "a mass movement of one."

2. Knowledge of the attitude of experts in a given area creates a tendency to bring one's own attitude into line with theirs. This effect is generally not as strong as the influence of the majority as may be shown by experimental studies contrasting the two forces. Marple found that 100 high-school seniors accepted 64 per cent of the chances to agree with the group opinion, and only 51 per cent of the chances to agree with a jury of experts; for 100 college seniors and 100 representative Iowa adults the figures were 55 and 45 per cent, and 40 and 34 per cent, respectively.[1] It may be that group opinion is more

[1] C. H. Marple, Comparative Susceptibility of Three Age Levels to the Suggestion of Group vs. Expert Opinion, *Journal of Social Psychology*, 1933, 4, 176–184.

potent in the economic, social, and political issues than it would be with more technical matters where highly specialized knowledge and advice are more likely to be followed. The proper evaluation of the expert's recommendation and viewpoint by nonexperts is a difficult question, particularly when it happens that experts disagree. Educationally it is unwise to encourage slavish submission to expert preference, for this means that insight into the bases of the opinion is denied in favor of a "parrotlike" duplication of the idea. An attitude represents a judgment or induction from experience, and its validity must be tested by the same means we apply to all utterances that profess to reveal a true state of affairs. On the other hand, a disrespect for competent authority and an unwillingness to consider its verdict is even more serious. Attitudes are natural events like blood clotting and the heart action, but all of us are strongly inclined to be defensive about them because they are such an intimate part of the self; the result is that their origin and transformation in one's own life are not dealt with as objectively as one may consider one's hair color and texture which seems to be a less central aspect of the organism. Perhaps the maturest reaction to expert opinion is to use it wherever available, but never to be dominated by it.

3. Prestige suggestion (other than that attached to the expert) resulting from a position of high social and community status is an important influence in the shaping of attitudes. Ordinarily youth has less prestige than age; the attitude of a teacher in any debatable question is more likely to be adopted by the class than the attitude expressed by some pupil; seniors in school notoriously have more prestige than freshmen. The result is that many attitudes are "picked up," *i.e.*, adopted ready-made. The halo or aura surrounding someone who is admired for his fame, power, beauty, strength, wealth, etc., leads many persons, especially early in life during the school years, to assimilate their attitudes on a variety of topics mainly because they emanate from a respected source. If a popular football coach asserts that Wisconsin is a better state university than Minnesota (or vice versa!), many lads of high-school age swiftly make

this attitude their own and may even forget the source of the suggestion. Teachers are not immune from this mechanism: Professor John Dewey declares himself in favor of the activity method of instruction and because of the great weight of his name in professional educational circles, many teachers assume a similar attitude without knowing the philosophical, social, and psychological reasons behind Dewey's decision.[1] Prestige suggestion is pedagogically undesirable even where it appears on "the side of the angels," for it means that an attitude has not been achieved by independent thinking about one's personal experiences or at least confirmed thereby.

4. An extremely significant source of firmly held attitudes is frequently found in a trauma, *i.e.*, a shock experience. The traumatic episode may vary in intensity, but to qualify as such it must refer to an emotional involvement of above-average magnitude. Some startling and dramatic occurrence is associated with the substance of a given attitude and accounts for both its presence and its exceptional vigor. A teacher may acquire a bitter antipathy to the State Educational Association because of some wound to his ego bestowed by an officer in this organization. Attitudes originating in a trauma of this sort are not marked by discrimination; the association is made to suffer for the tactlessness of one of its representatives even though a thoughtful person would have differentiated his animosity. A trauma involves an illicit generalization from a single instance. Although such attitudes must be treated sympathetically, it is clear that personality betterment demands their elimination since they are based on maladaptive reactions.

5. In developing any single attitude or a group of attitudes, strictly rational operations are usually minimized, but they are never wholly absent. The relation of an attitude to the "facts" upon which it is

[1] This prestige suggestion is often curiously limited, perhaps because rival prestige forces are working in an opposed direction. Thus, Professor John Dewey supported the Presidential candidacy of Norman Thomas in 1932, 1936, and 1940 without adding noticeably to his votes among teachers. Dr. Dewey himself modestly doubted whether more than a dozen educators were swayed to vote for the Socialist nominee as a result of his endorsement.

built is not a simple one since many attitudes are maintained in the face of mounting evidence of their untenability. Nonetheless, even the most rigid and resistant attitudes are not wholly impervious to the effects of new data. This is a truth of tremendous proportions for it means that even education that is largely of an informational sort does affect the kind of attitudes ultimately established in the learner; it also implies that the nature of the stimuli applied or withheld is the critical pedagogical factor in the process. It is not as yet customary for schools to test the attitudes of their pupils on all sorts of problems — social, religious, historical, etc. — for the same reason that their knowledge or achievement in different areas is a matter of major concern. However, any rational handling of a pupil's attitudes does require that one know at least roughly what they are and provide for some public "ventilation" or discussion of every representative opinion. An illustration of this may be found in connection with a sample set of attitudes reported by 10,000 American elementary-school teachers drawn from every state in the Union. A few of them appear in Table XI.

These statements all refer to questions which at one time or another have concerned the teachers of this country. As is the case with almost every attitude proposition, unanimity of opinion does not exist, although it is approximated in all items where 96 per cent or more of the group express "agreement" or "disagreement" with the statement. Most of these questions have probably been the subject of vigorous discussion at one time or another in the lives of the persons who expressed an opinion concerning them. Nevertheless there are some surprises in the answers which indicate that these elementary-school teachers have not responded to *all* or even the key facts pertaining to each attitude. The rational basis for judgment is consequently absent or in some way defective. Thus, as we have noted before in this volume, it is a bit startling to find that fully 56 per cent — a clear majority of the group — denies one of the cardinal generalizations of modern biological science, *viz.*, that, "The human race evolved from other forms of life during the millions of years that this

*Table XI. Distribution of Opinion of 10,000 American Elementary-school Teachers on Certain Attitude Items* *

| Per Cent Marked Agree | Per Cent Marked Disagree | Per Cent Omitted | Teachers' Attitudes |
|---|---|---|---|
| 91 | 8 | 1 | 106. There is a personal God or Divine Being who created this world. |
| 92 | 6 | 2 | 107. The "progressive-education" movement has contributed greatly to the improvement of the curricular content and teaching procedures of our schools. |
| 83 | 14 | 3 | 108. Every human being has an immortal soul that continues to live a separate existence after the body disintegrates. |
| 11 | 88 | 1 | 109. Married women teachers are undesirable members of a school staff. |
| 40 | 56 | 4 | 110. The human race evolved from other forms of life during the millions of years that this earth has existed, and is definitely related to other animals, particularly the anthropoid apes. |
| 9 | 89 | 2 | 111. Jesus Christ was a great man and ethical thinker like Socrates and Confucius, but it was an unfortunate historical outcome that he came to be worshipped as the Son of God. |
| 60 | 38 | 2 | 112. The sitdown type of strike is impossible to justify under any circumstances. |
| 36 | 63 | 1 | 113. Capital punishment should be abolished as an outmoded and useless way of treating criminal behavior. |
| 25 | 74 | 1 | 114. The American Negro today has all the educational opportunity he deserves. |
| 2 | 97 | 1 | 115. The growing use of "current events" references in all school subjects is to be condemned. |
| 92 | 7 | 1 | 116. The increasing emphasis upon "social problems" in general education is a gratifying sign. |
| 90 | 7 | 3 | 117. It is a commendable human effort to try to bring about peace through a world state or some international federation of coöperating commonwealths. |
| 40 | 57 | 3 | 118. In voting it is always preferable to support the "lesser of two evils" if the candidate whom one really desires has no objective probability of winning. |
| 84 | 14 | 2 | 119. Social changes should always be made by gradual evolutionary means and never by rapid revolutionary reorganization. |
| 11 | 88 | 1 | 120. The "activity" program of instruction has done more harm than good to sound educational ideals. |

* Cf. G. W. Hartmann, Social Attitudes and Information of American Elementary-school Teachers, *Journal of Educational Sociology*, 1938, **2**, 506–510.

*Table XI. Distribution of Opinion of 10,000 American Elementary-school Teachers on Certain Attitude Items (continued)*

| Per Cent Marked Agree | Per Cent Marked Disagree | Per Cent Omitted | Teachers' Attitudes |
|---|---|---|---|
| 97 | 1 | 2 | 121. Government should serve the interests of all classes of citizens and not of one class alone, whether that favored class be a small group at the top or a large mass at the bottom of the social scale. |
| 70 | 28 | 2 | 122. The highest duty of the educator is to promote creative experiences. |
| 98 | 1 | 1 | 123. A stimulating environment and an atmosphere of encouragement should be guaranteed to every school child. |
| 40 | 51 | 9 | 124. The Committee on Industrial Organization has done less to advance the welfare of the American working class than the regular officials of the American Federation of Labor. |
| 65 | 34 | 1 | 125. School marks should be abolished with all the other paraphernalia of an antiquated, competitive, and artificial educational machine. |
| 55 | 40 | 5 | 126. Any one who opposes the practice of "homogeneous grouping" is willfully disregarding the best scientific evidence in its support. |
| 69 | 30 | 1 | 127. Repeated drills on fundamentals should be much more widely used than is now the case. |
| 7 | 88 | 5 | 128. An immediate replacement of capitalism by state socialism would benefit the inhabitants of this country. |
| 98 | 1 | 1 | 129. The elementary school should be an integral part of community life. |
| 4 | 95 | 1 | 130. Guidance of children of elementary-school age can be performed adequately without a knowledge of the forces affecting the child out of school. |
| 98 | 1 | 1 | 131. Elementary schools should be organized to fit the needs of children for whom they are intended. |
| 97 | 2 | 1 | 132. A teacher of elementary grades should maintain a democratic relationship with the pupils. |
| 40 | 58 | 2 | 133. A minor aim in character education in the elementary school is the development of children's ability to coöperate. |
| 96 | 3 | 1 | 134. A teacher should be absolutely impartial in dealing with all children, regardless of their race, creed, economic status, or nationality. |
| 4 | 95 | 1 | 135. Teachers of elementary-school children have little need for a knowledge of socio-economic problems in dealing with their pupils. |
| 7 | 92 | 1 | 136. An elementary-school teacher must be a dictator with pupils from 5 to 14 years of age. |

earth has existed, and is definitely related to other animals, particularly the anthropoid apes." In other words, more than half the teachers in our vast public-school system reject the principle of organic evolution, one of the greatest discoveries of the human mind. This unexpected conservatism in scientific matters is probably related to the dominance of an older theological world view in the community culture in which these teachers grew up. More information from the fields of geology, paleontology, biology, comparative psychology, could hardly fail to confirm the essential correctness of the Darwinian insight and change the distribution of opinion to 100 per cent agreement and zero dissent.

It is important to recognize, however, that sharp contrasts in attitude may understandably persist when the empirical foundation for antagonistic views is incomplete. Even where the data seem adequate, competent minds may reach opposed attitudes because differences in emphasis and internal organization of the separate facts are still possible. The search for a consensus nevertheless goes on, for there are ways known to scientific method of checking whether one version of reality is more in harmony with the truth of the situation than another. It is educational skepticism of the worst type to hold that any man's attitude is as good or as valid as another's when actually some attitudes are "enlightened," *i.e.*, built upon the nature of the universe or "the nature of human nature," and others unenlightened because of their failure to include all the information relevant to the value judgment. For example, to assert that "Married women teachers are undesirable members of a school staff" is to hold a belief that disregards the research studies which compared the educational effectiveness of married women teachers with unmarried female instructors and revealed the former to be as useful professionally as the latter. Similarly, a defense of capital punishment must meet the implications of statistics showing that the homicide rate in states and countries that have abolished it is no higher than in areas where it is retained. These are considerations which teachers need to apply to

their own attitudes before they can be as successful as they should be in the modernization and renovation of the opinions of their pupils.

One fact about attitudes stands out prominently: They are retained unchanged as long as they produce a balance of satisfaction in the person who holds them, and they begin to be modified as soon as they involve dissatisfaction. The adolescent boy may be disposed to believe that girls are strange and useless creatures — an antagonism which may serve a purpose in keeping him busy with other matters until he has matured physically and mentally before paying "serious" attention to them. A high-school teacher may hold that his most important job is to "know his stuff" until he finds that a mere logical exposition of his subject is insufficient to maintain the good-will of the class; he may then develop the attitude that it is most important to meet the life needs of his students even if much of the content he himself enjoys must be eliminated because of its unsuitability to this aim. Obviously the only "safe" or permanently satisfactory attitudes are those that conform to the outcomes of mature and comprehensive experience. Such attitudes cannot be given at the start of schooling, but they should serve as directives to define the end toward which it is moving.

## THE ENRICHMENT OF PERSONALITY THROUGH INTERESTS

To be interested in certain types of experience normally means that one is intimately and agreeably identified with these activities. An interest in public speaking, for instance, implies that one enjoys listening to prominent actors, that one reads books and articles pertaining to problems of delivery and composition, that one likes to talk about these questions with others, and that one prefers conversation or addressing an audience to doing many other things. An interest in Mayan archaeology similarly suggests that one is glad to learn new facts about this old Indian culture and that it has some pertinence to the welfare of the organism as that organism in its present

state construes its own "welfare." Historically the education provided in the schools has devoted much of its energy to the creation of "subject" interests of this sort.

There is, however, another type of interest which grows out of the problems of personal and social adjustment that individuals face in ordinary living and which touches more directly the issue of character formation. A student who says he is troubled by his temper, his hyperaggressiveness, or his poor memory is clearly "interested" in shaping his own nature so that it conforms more closely to his own ego ideal. These subjectively centered interests differ in some respects from such more objective interests as an enthusiasm for medieval Persian art and are probably of more importance to a psychologically centered program of education. The following list is representative of those found at the junior-college level. They were obtained in answer to a request to "submit no less than 5 and no more than 10 major life problems which cause you definite *emotional* concern and which demand your best *intellectual* efforts in order to solve them, these to be ranked in a diminishing order of importance."

Is it not highly significant that the things which deeply matter to a group of selected college men and women are all matters which rotate about their own selves? Why Rome fell, the lost art of making transparent porcelain, the topography of the opposite side of the moon, and the secret of the power of the Brahmins in Hindu society — all these appealing academic "puzzles" or anything equally esoteric remain unmentioned. If this be the true relation of "personal" and "impersonal" interests at a fairly advanced rung of the educational ladder, how much direct concern in scholarly affairs have teachers a right to expect with even younger and less intellectually gifted pupils?

**The mechanism of interest growth.** The problem of interest is one of the most acute in all education because the experiences that the learner acknowledges as real issues to him are not necessarily those which the ordinary school curriculum emphasizes. Typically he wants to know (1) how to deal with a "lack of confidence" in himself, but

*Table XII. Diminishing Rank Orders of Significance of Personal Problems Based upon Subjective Estimates Reported by 100 College Students* *

| 1. Arranged with Respect to Grand Frequency of Mention | | 2. Arranged According to Proportion of First Mentions to Total Mentions under Each Item | | 3. Arranged According to Relative Position in Individual Series | |
|---|---|---|---|---|---|
| Raw Number | | Per Cent | | Index Value | |
| 55 | Vocation | 40 | Vocation | 0.446 | Vocation |
| 45 | Sex | 33 | Inferiority | 0.459 | Inferiority |
| 32 | Personality development | 28 | Personality | 0.475 | Personality |
| 31 | Finances | 27 | School work | 0.505 | School work |
| | Will power | 22 | Self-conscious | 0.516 | Finances |
| | Friends | | Lack of confidence | 0.525 | Too aggressive |
| 27 | Religion | 21 | Parents | 0.529 | Temper |
| | Temperament | 20 | Temper | 0.534 | Parents |
| 26 | School work | 19 | Religion | 0.537 | Self-confidence |
| 25 | Philosophy of life | 16 | Finances | 0.539 | Self-conscious |
| 24 | Parents | | Philosophy | 0 544 | Health |
| 23 | Self-conscious | 15 | Aggressive (too) | 0.553 | Sex |
| | Concentration | 13 | Sex | 0.568 | Will power |
| 22 | Inferiority complex | 12 | Poor memory | 0.572 | Speech |
| | Social graces | 11 | Selfishness | 0.601 | Concentration |
| 21 | Ethical code | | Health | 0.603 | Ethical code |
| 19 | Health | 10 | Insubordination | 0.606 | Selfishness |
| 15 | Day dreaming | | Ethical code | 0.615 | Insubordination |
| | Fears | | Will power | 0.616 | Temperament |
| | Speech † | 7 | Day dreaming | 0.621 | Too submissive |
| 13 | Too aggressive | | Temperament | 0.640 | Day dreaming |
| 10 | Temper | | Fears | 0.661 | Religion |
| • | Insubordination | 4 | Speech | 0.663 | Friends |
| 9 | Self-confidence | 3 | Concentration | 0.690 | Poor memory |
| | Accepting conventions | 0 | Friends | 0.708 | Fears |
| | Selfishness | | Accepting conventions | 0.711 | Philosophy |
| 8 | Poor memory | | Social graces | 0.724 | Accepting conventions |
| | Too submissive | | Too submissive | 0.795 | Social graces |
| 2 | Hobbies | | Hobbies | 0.935 | Hobbies |
| $r_{12} = 0.38$ | | $r_{13} = 0.49$ | | $r_{23} = 0.78$ | |

* From G. W. Hartmann, The Classification of Adjustment Problems among College Students *Journal of Abnormal and Social Psychology*, 1933, **28**, pp. 64–69

† Speech item includes ability to address audience, conversational freedom, and quality of voice.

he is asked (2) to learn that "the ratio of the impressed voltage of the primary to the induced voltage of the secondary of a transformer is equal to the ratio of the number of turns of wire in the primary to the number of turns of wire in the secondary." The pedagogy of interest is essentially the art of bridging the gap between an existing interest of the first type and a potential interest in something initially remotely related to it, as represented by the second type.

It is fortunate that every pupil has some current interests upon which instruction can be built. A person without any interest in any experience whatsoever is a myth, although an individual in a suicidal mood may approach this state. Granting the existence of some interest, however faint and limited in scope, it becomes technically possible to expand this to embrace many "distant" experiences. Thus, suppose a pupil's sole intellectual or scholastic interest is one concerned with Indian legends. He may know a few or many as the case may be, since we wish to make the hypothesis as extreme as possible. However, it is impossible for him to know them all without qualifying as a highly specialized ethnologist or researcher into primitive folklore. The learning of a group of Indian legends is the core about which other information can be attached. The stories have a content pertaining, let us say, in some instances to natural phenomena such as the stars. The tale is *by* Indians, but *about* something non-Indian like the heavenly bodies. This provides a "peg" upon which some simple popular astronomy may be erected. Another tale may deal with the wanderings of the tribes over the continents, an incident which may be "footnoted" to refer to some geographical and historical facts. Still another may touch upon the smelting of copper for the making of primitive implements, a feature that offers the possibility of introducing some elementary metallurgy. Without pursuing the illustration further, it is clear that even a highly artificial instance shows what can be done to enlarge the sphere of interest from an initially circumscribed condition.

We have here a major conception in all educational psychology. Linking any datum with one in which positive interest already exists

serves to diffuse an "interested" response over the entire new arrangement. The pupil admires Andrew Jackson; discovering that he was a Democrat in partisan politics may create a derived interest in this organization as it survives today! Once the derived interest is itself safely established it no longer depends upon the original core to maintain itself but may in turn serve as a "moving center" from

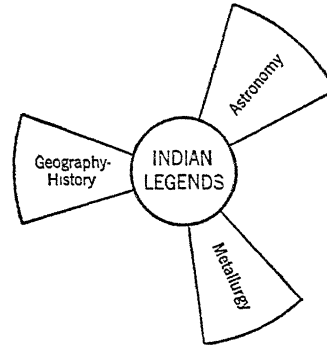



FIGURE 50

A "hub" from which "spokes" radiate; or, better, a main stem or trunk from which branches bud and ramify.

which new interests may bud. This differentiation of interests theoretically may proceed indefinitely and actually does exactly that. Many teachers who can recall the evolution of their own interests found literally that one thing led to the next, *i.e.*, an interest in A aroused an interest in B which came first as an aspect of A; and an interest in B similarly made possible an interest in C which in like manner had at the start a part or dependent relation to the whole in which it was embedded. If a pupil is to become interested in something that on its face is purely "neutral stuff," the teacher must always be able to show its connection with some existing interest. Since all learners are necessarily to some extent interested in themselves, the process of making new knowledge "personal," *i.e.*, referring it directly to the organism and its properties, is one of the surest methods of evoking interest in it.

**Life-giving quality of positive interest.** Interest may then be said to be an active condition of the learner symptomizing the fact that the experience in which he is participating is contributing to his personality development. The presence of interest in any school activity is therefore to be interpreted as a sign of educational health; its absence, per contra, signifies some maladaptation between the pupil and the offering. There is no more certain way of making a pupil miserable than to compel him to continue long at a task that is repugnant to his nature. It is fortunate, however, that an activity which may be uninteresting for a time may under certain favorable circumstances eventually acquire some measure of positive interest for the person, particularly if there occurs growth in ability to do the task successfully.

A teacher who gives a " required " course and a pupil who is compelled to enroll in it are both often faced with the serious question of low interest in its content. This constitutes a block to fluent learning and the obstacle must be removed as early as possible by the joint efforts of student and instructor. The former must try to appreciate the considerations which led the faculty to make a certain course compulsory and ask if there isn't something of personal value there for him even if it is not apparent at first sight, on the reasonable assumption that anything that ever interested any other human being is also potentially interesting to him. The latter has the task of fitting the material to the prior interests of the pupil, showing clearly its relationship to his major life purposes and to his own current needs, and thereby making it glow with the reflected radiance of these more obvious wants. An indifferent mathematician but a good historian, for instance, may be encouraged to study the biographies of eminent mathematicians and by this route come into agreeable contact with the contributions for which these men are famous. Of course, limitations in intelligence or special abilities will confine the learner's interest to certain " levels " of a topic and effectually debar him from ever becoming vigorously interested in some fields. The very fact that a person is interested in certain topics such as the historic " problem

of the three bodies" in mechanics or the differences between the flora and the fauna of the Azores and the Canary islands is itself *prima facie* evidence of intellectual superiority. There is no magic known to educational psychology by which any pupil A can be brought to interest himself in any activity $x$, if $x$ is dependent upon certain attributes that A does not possess. Trying to interest a 4-year-old boy in the calculus is an educational absurdity, whereas the same effort with a college sophomore is one of the first commandments of good instruction.

## SUMMARY

In this chapter we have presented the view that personality is to be improved primarily, though not exclusively, by the addition and rearrangement of ideals, attitudes, and interests. These valuational aspects of an individual's nature constitute the core of his character. If these are "sound," other mental-hygiene features such as excessive worries and facial mannerisms are reduced in importance and tend like all symptoms to clear up as soon as the underlying "disease" has been cured. Symptoms, however, are not unimportant, for they are part of the total pattern of adjustment achieved by the organism.

The treatment of an individual who is a "personality problem" (and everyone is that to some extent, if not to himself at least to others on occasion!) requires that he first be diagnosed with respect to his earlier development and the principal forces affecting him in his social field. Such diagnosis is successful to the extent that it uncovers the basic "theme" or design for personal living which every person exhibits even during the early years of life. Therapeutic measures must then be based upon the nature of this pervasive theme, either by providing the person with added resources for acting in accord with it or by proper modifications in the central or controlling theme itself.

The most important influence that the school exerts in forming a character appears in the ideals that it encourages. These are generalized systems of response that serve to regulate the more detached

and segmental motor habits. Teachers can help a child form an image or model of the kind of person he wishes to be and assist him in shaping his conduct in accordance with this preferred plan. To concentrate on surface formulas like "Thank you, Sir" and pushing the spoon through the soup in a direction away from the body means to emphasize external parts at the expense of larger wholes. Character education that is absorbed in specifics like the memoriter learning of a religious catechism is necessarily inferior to one which creates broader ideals of social service, democracy, scientific method, etc.

For similar reasons, attitudes and beliefs comprise a major part of the total personality. Here the chief pedagogical problem is to deal with attitudes on the basis of pertinent facts and not on the basis of uncriticized tradition or haphazard prejudice. Pupils and teachers both develop opinions on an extraordinary range of questions, which, unless systematically re-examined, result in contradictions and injustices that minimize the effectiveness of their personalities. It has been wisely said that men will be guilty of cruelties so long as they believe absurdities; every wrongly grounded attitude is therefore a potential threat to the happiness of some person or group. The attitudes of educational workers themselves are far from harmonious or adequate on significant social, political, economic, philosophical or religious, and even educational issues, but within the sphere defined by the "common denominators" of various groups within the culture or community, important corrective and remedial enterprise can go on.

Personality is also significantly influenced and revealed by the depth and variety of the interests that develop. Education is concerned to increase both. The creation of a broader "apperceptive background" or mass of ideas is achieved principally by making a contemporary interest serve as a base for the erection of new interests which in turn serve the same function for others *ad infinitum*. The boy who is interested in dynamos probably had a different personality to begin with than the boy who is interested in medieval illuminated manuscripts, but this difference is increased by these specific inter-

ests themselves. However, both of them now have richer personalities than the boy who lacks such "hobbies." By starting with his immediate personal problems as seen by the pupil and fusing this interest with the materials of curricular instruction, teaching serves to expand and alter interests and concurrently to modify the personality in the way it wishes to be changed.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. State as fully and as frankly as your own self-awareness permits the essential "theme" of your life as it appears up to the present. Do you accept it as a true revelation of yourself?
2. What representative ideals in a secondary-school student do you believe help him make a superior educational adjustment? Which act to handicap his effectiveness as a pupil?
3. What are some of the consequences of treating a *symptom* rather than a *cause* in cases of personality difficulties?
4. Specify those changes in the present conditions of their work which would improve the mental hygiene of teachers or of teaching as a profession.
5. Is it possible to form an ideal of the desirable character apart from an ideal of a desirable society?
6. Consider in detail the causes of cheating in school situations. How can it best be prevented?
7. What does the "habit of revising habits" imply for the problem of making one's attitudes reflect the realities of fuller experience?
8. An ancient puzzle in theoretical psychology that is still of some pedagogical significance concerns the nature of the relation between "interest" and "attention." Superficially it bears some resemblance to the old question of the priority of the hen or the egg. How do you resolve the difficulty? Is it a real or a spurious problem?
9. How is a person's character reflected in his attitudes on public and professional issues?
10. What are the determinants of the prestige of a (*a*) person, (*b*) institution, (*c*) profession, (*d*) field of study or "course"?
11. What does "success" or "failure" do to an individual in these situations: (*a*) School subjects, (*b*) extracurricular activities, and (*c*) personal and social relations?

## *Chapter 13*

# *THE IMPROVEMENT OF SOCIAL BEHAVIOR AND GROUP RELATIONS*

A classroom is a miniature society exhibiting on a reduced scale many of the problems of the relations between the individual and the group that are encountered in the larger life of the nation and the world. Easily distinguished are the relations that exist between the teacher and each pupil taken singly or between the teacher and the class considered as a unit; less readily detected are the relations between individual students and particularly between certain subgroups that may form within the whole. The efficiency of the learning processes conducted under school conditions and the happiness of each participant are often significantly determined by the nature of many of these subtle and commonly overlooked " social " influences.

One of the principal functions of education is to assist in the establishment of an optimum relation between the individual and the group, no matter who the person may be or the size and nature of the social group of which he is a part. This mutual adaptation cannot be done by working upon the group as such because, paradoxically enough, there is no such thing. Psychologically — and one may suppose in every " real " way save the conceptual sense — only individuals can be educated. Groups are not educable; persons are. The only way to be good to a group is to do a friendly turn for the living people who constitute it, just as, in Chapter 3, we emphasized the fact that the only way to be of service to a person is to further the activities of his bodily organism.

## PROMOTING CO-OPERATIVE BEHAVIOR

Improving a pupil's social behavior means transforming his reactions to other persons so that both they and he reach levels of satisfaction higher than could be obtained without this interaction. Such an outcome is not guaranteed by the appropriate conduct of *one* member to the relationship but needs the corresponding conduct of *all* persons involved in the life of the group. Associated activities can make people happier than they would otherwise be, but when conflict arises, it can also make them far more miserable. The aim of education for better group relations must therefore center largely about the prevention and elimination of conflicts and the increase in the capacity for frictionless co-operative behavior.

It is one of the great puzzles of formal schooling that it has rarely made the problems of mutual association an important part of pupil experience, despite the fact that the school itself is one of the major institutions for the socialization of the younger members of the community. Because an individual is always a member of some social organization and never out of the reach of the influence of other people, it is a vital survival matter to know how to make this inevitable and necessary tie with one's fellows conduce to everyone's advantage. Early familiarity with these skills is objectively as important as any curricular content with the possible exception of health habits. Adults themselves are none too adept in these affairs as the tensions of industrial and international conflict plainly indicate. These may have other than purely psychological causes, but the psychological factors are never absent.

That the actual life history of the person is a major factor affecting his action and thinking in the social sphere is a matter of tremendous significance to the educator since the content of that "life history" is controllable at least within the limits of the schoolroom. Note the following crucial facts in the field of adult education which has been much affected by the work of agricultural-extension specialists and "county agents." Zimmerman secured a correlation approaching

unity between the amount of experience a group of farmers had had with the co-operative marketing or selling of their products and the frequency of attitudes favorable to this type of associated behavior. Here are the data:

*Table XIII. The Relation between Attitudes and Experience in Co-operation* *

| Amount of Experience in Years | Number of Farmers | Per Cent Favoring Co-operatives |
|---|---|---|
| None | 32 | 16 |
| 1–5 | 96 | 73 |
| 6–10 | 67 | 82 |
| 11–15 | 54 | 91 |
| 16–20 | 19 | 95 |
| 21–25 | 19 | 95 |
| 26–30 | 18 | 100 |
| 31–35 | 13 | 100 |
| More than 35 | 27 | 100 |
| Total | 345 | 79 |

* C. C. Zimmerman, Types of Farmers' Attitudes, *Social Forces*, 1927, 5, 592–593.

The author draws the conclusion from this extraordinarily close connection that " in the long run, objects of overt experience determine their own attitudes " — a generalization that is probably impeccable. It is odd that even after 15 to 25 years of experience with co-operative distribution, 1 farmer in 20 was still antagonistic to this method; but far more important psychologically and educationally is the fact that without such opportunity, 5 out of 6 would be opposed to a practice that demonstrably benefits them.

## EXPERIMENTS IN THE CONTROL OF CONDUCT

The school is potentially an even more powerful instrument in the creation of a co-operative disposition, for it affects a greater variety of responses at a more impressionable period of life. Co-operation, however, is not to be viewed as a good in its own right without regard to the aims and content of the helpfulness to which it refers. It is not enough to succeed in producing co-operativeness among the A mem-

bers of a group and also among the *B* members if the consequence is an intensification of the conflict between the *A* and *B* groups as a whole. Paradoxically, such limited co-operation merely leads to a deepening of the competitive hostility by giving to the latter the support of important group sanctions. War between nation-states is the classic instance of this. If the co-operative tendency is checked in its growth by allowing it to stop at some level short of universality, it may actually be hurtful to group adjustments by magnifying their rivalries.

No form of co-operation is valid or justifiable as a form of human association unless the individual "gets something out of it" which he could not otherwise obtain. In some pseudo-co-operative relations, certain persons are really exploited by others who take advantage of their readiness to be of service. Thus, if a committee of five pupils is formed to take care of a routine duty and one member regularly does all the work, the other four are clearly not doing their proper share and the co-operation is one in name only. Similarly, the assignment of duties to someone without his consent and then stigmatizing him as "non-co-operative" because he may exhibit a reluctance to discharge them is a psychological error of the first magnitude. These abuses of a fundamentally sound idea may lead many who are thus victimized to "sour" on the general conception itself, a disastrous consequence by any test. Authentic co-operation must be sharply distinguished from such fictitious forms. What the marks of genuineness in this sphere are cannot be formally catalogued, but the following situation from a study by Mowrer made at the Yale Institute of Human Relations should assist in providing a basis for judgment: [1]

. . . Whenever children live communally, certain minimal requirements must be enforced and at least a limited number of rules observed. Such was the problem which existed in the cottage at the New Haven Children's Center at the time that the venture which is here reported was undertaken.

[1] From O. H. Mowrer, Authoritarianism *vs.* "Self-government" in the Management of Children's Aggressive (Anti-social) Reactions as a Preparation for Citizenship in a Democracy, *Journal of Social Psychology*, S. P. S. S. I. Bulletin, 1939, 10, 122–123.

After several unsuccessful attempts . . . it was decided to inaugurate a modified form of self-government. One evening in the month of July, 1937, the 24 children (ranging in age from 4 to 12 years) who then constituted the cottage population were called together. It was explained to them that in the future they might meet, with the cottage staff, whenever it seemed necessary and themselves deal with whatever problems might have arisen. A utilitarian basis for social morality was presented to them and contrasted to authoritarianism. It was pointed out that stealing, for example, was objectionable in the cottage, not simply because grown-ups might say it was "wrong," but because if one child was allowed to appropriate things belonging to another, there would soon be no safety for the belongings of anyone. A similar utilitarian basis was given from time to time at future cottage meetings for truthfulness, cleanliness, and so forth.

Naturally the soundness of this empirical basis for morality had to be demonstrated a few times before the group fully accepted it. On one occasion, for example, four or five small boys thoughtlessly broke out some window screens on a play-porch. The matter was reported and brought up by the other children in a cottage meeting. While the youngsters who had committed the destruction were earning enough money to pay the fines which were assessed to help repair the screens, the whole group became sufficiently aware of the nuisance value of flies and mosquitoes to develop a strong sentiment for the future protection of not only screens but many other useful cottage appurtenances as well. A few such empirical lessons made the restraints essential for harmonious cottage life take on a reasonableness which could scarcely have been achieved through arbitrary adult enforcement.

Some of the advantages which accrued from this new regime had, of course, been anticipated but others had not. As enforcement of the necessary regulations and prohibitions was taken over more and more by the group itself, the staff members ceased to be regarded primarily as disciplinarians, who were to be outwitted, harassed, or placated, as the occasion might demand; and the total number of infractions which had to be dealt with decreased at a remarkable rate. The children became much freer in their relationships with the adults, able to share their phantasies and to speak about matters which, because of previous anxieties or resentments, would have been impossible to discuss. Soon the cottage meetings also came to be used as an occasion for reporting commendable as well as objectionable behavior,

and an additional motive for good behavior, in the form of a desire for group praise, was thus added to the already existing influence of group disapproval. In the beginning it was found that the children were inclined to be more severe with each other than an adult would have ordinarily been under similar conditions. Since the cottage meetings are always conducted under the supervision of representatives of the cottage staff, overly severe punishment could always be toned down to be in keeping with the offense. This placed the adults in the strategic position of being able to befriend and protect the offender often instead of having to be aligned against him. This was a particularly useful device in gaining the confidence and goodwill of children who have had a long history of resentment and antagonism towards adults in their earlier environments.

Experiences of this sort point to the importance of the psychological atmosphere or "mental climate" in producing the results that one hopes to achieve in the direction of more social-minded behavior. This atmosphere operates very much like a specialized subculture upon the persons exposed to its influence. The way things are done, *i.e.*, the specific local folkways or organization ways, exercises an influence upon the witness or participant in the direction that is thereby suggested.

**Experimental study of forms of government.** Such a generalization is strongly reenforced by the interesting experiments of Lewin and his pupils Lippitt and White on the differential behavior of children working in either an "autocratic" or a "democratic" atmosphere. From the children who volunteered to be members of a club devoted to the somewhat bizarre purpose of making theatrical masks, two groups with members matched according to friendship-rejection, leadership traits, etc., were created. In one experimental series, a democratic and an autocratic group working under the same student leader were compared; in another four different groups under four different "heads" passed respectively through three distinct social atmospheres, *viz.*, the democratic, the autocratic, and the "*laissez-faire*." The situational climate was created in each instance by the leader who established the informal "rules" of the club. Specifically,

in (1) the democratic group, the leader acted as a regular member of the boys' club, all questions of policy being decided by the children themselves; in (2) the autocratic group, the members were told what to do, how to do it, and with whom to work — all in a friendly way and without any active suppression of the individual in the manner of a benevolent teacher who believes in strict discipline; in (3) the *laissez-faire* club, the leader removed himself from the group as much as possible, remaining available for the giving of needed information if asked, but offering no encouragement to co-operative decisions.

The findings are of extraordinary interest because they show how fruitful experimentation with "artificial" or miniature social "systems" under relatively normal educational conditions can be. Lewin's summary of the quantitative and qualitative differences in the behavior of the contrasted groups is rich in significance and will repay careful study: [1]

(*a*) Probably the greatest quantitative difference is the amount of *hostility* expressed among the members of the group. It is about thirty times as high in the autocratic group as in the democratic group.

(*b*) This is probably due partly to the greater *tension* which seems to prevail in the autocratic group. This tension shows itself in the fact that the *total volume of social interaction* is 55 per cent greater in the autocratic group, in spite of the fact that objectively there is less need of communication in regard to the ongoing activity because it is directed by the autocratic leader.

(*c*) The autocratic group shows a *less stable group structure*. In 38 per cent of the time the members of the autocratic group work each by himself (group structure 1–1–1–1–1), or only one of the children works with another (2–1–1–1), whereas, in the democratic group such structure occurs only in 18 per cent of the time. The more cooperative group structures in which all or at least four of the five children worked together (5, 4–1) occurred in the democratic group much more frequently: 56 per cent, against only 12 per cent in the autocratic group. In the autocratic group the more cooperative group

[1] Kurt Lewin, Experiments on Autocratic and Democratic Atmospheres, *Social Frontier*, 1938, 4, 318.

structures had to be built up by the experimenter and had a tendency to break down rather quickly, whereas in the democratic group this cooperation developed spontaneously.

(*d*) The autocratic group shows *more dominating behavior* and *less objective behavior*. This difference was particularly great in relation to out-groups where the autocratic group showed 102 per cent more ascendent behavior than the democratic group.

(*e*) The democratic group showed 47 per cent more feeling of "we'ness" as expressed in language and in test situations; the autocratic group 27 per cent more feeling of "I'ness."

(*f*) It is in line with this that the democratic group showed *more cooperative* endeavor: more often cooperation was offered and asked for, and there were many more occurrences of praise and expression of friendliness.

(*g*) There was more expression of an objective, *matter-of-fact attitude* in the democratic group, as against more *personal feelings* in the autocratic one: many more constructive suggestions were offered in democracy and there was more give-and-take of objective criticism without personal involvement.

(*h*) The *constructiveness* was higher in the democratic group as shown in the superiority of the group products. Certain test periods where the experimenter left the room for a short while were introduced. In such periods, typically, the constructiveness of work in the autocratic group fell down very quickly, whereas in the democratic situation work went on with very little change.

(*i*) Feeling for *group property* and *group goals* was much better developed in the democratic group. The records show that the children at the close of the club had the tendency to destroy the masks or take them for themselves individually in the autocratic group, whereas in the democratic group they presented them to their leader and teacher.

(*j*) During the twelve meetings of the club twice the situation of a *scapegoat* arose, where the whole group ganged together against one of the members. At the fourth meeting most of the hostility was directed against one member. The next day he was still the center of hostility. As a matter of fact, he was treated so badly that he ceased to come to the club. A few weeks later another member was made the scapegoat. He too quit, saying that he had bad eyes and that he could not come because his physician said his eyes needed the fresh air.

As a whole one might say then that the autocratic situation was characterized by what one might call a state of higher " basic tension," less objectivity, and more hostile aggressiveness. This aggressiveness was not directed openly against the autocrat (towards whom the children generally were rather submissive) but tended to find an outlet in the easy and less dangerous way of attacking a scapegoat.

The motion picture films of the facial expressions and actions of the same children when transferred from one atmosphere to another were extremely enlightening. Lively and intense work, animated conversation, and a general high tone of response characterized the last day of the " democracy " climate; after a few days of " autocracy " the faces of the youngsters grew apathetic, independent productive work declined, and free expressiveness died down. The *laissez-faire* situation was intermediate in its effects upon conduct, but on the whole it was closer to the autocratic pattern; boredom, horseplay, and other evidences of personal and group disintegration are pronounced in the *laissez-faire* arrangement which is often erroneously confused with the co-operative collectivism of the true democracy.

These pioneer experiments supply convincing evidence that democracy in learning and teaching situations is not a mythical pseudo-problem, but a factor of outstanding significance in the entire educative process. It has long been known that classrooms as well as national cultures throughout the world follow one of the three general patterns outlined in the foregoing, but this is the first precise knowledge we have of what different social structures do to their members. The way the teacher designs the social field for his pupils largely determines the behavioral phenomena that they will display. Significant, too, is the demonstration that an authentic democratic schoolroom is a co-operative one, and not one in which each pupil goes his own way or tries to nose out his neighbors; the latter is a *laissez-faire* situation with markedly different properties. It seems clear that if certain types of group behavior are considered desirable the governing stimuli in the hands of the teacher must conform to the democratic-co-operative plan, or the social relations established

among the pupils will be of an entirely different sort than those valued by most contemporary educators.

## TECHNIQUES FOR DEVELOPING CO-OPERATION

If behaving democratically means behaving co-operatively, then instruction that aims at securing either must necessarily include both. In the preparation of a Yearbook on *Teachers and Cooperation*, the committee appointed by the Department of Supervisors and Directors of Instruction of the National Education Association found it necessary to distinguish this action pattern from other forms of associated living that have appeared in the past and are still operative in our midst. The levels of behavior here classified are probably not sharply separated from each other; they indicate only that the uses of certain social techniques have the consequences commonly connected with them and that persons trained to follow one set of values will use some techniques to the exclusion of others.

### Levels of Cooperation

Let us follow through the evolution of human relationships in working together. We might take as our zero point the life of a savage, so primitive that he has not even achieved family life, but lives alone in a forest, thinking and acting in terms of impulses and his own "free" will. When one savage of this type met another, conflicts occurred; they were settled by might. The strongest man *only* achieved his desire.

### First Level: Compulsion

There have always been individual differences in strength, and when some strong man became aware of his power, he began to use it to compel other men to help him achieve his purposes. When one man works with another doing as he is bid because compelled to against his will, the level of cooperation will be called *compulsion.* Compulsion may operate from individual to individual, from group to individual, or from group to group. Italy compelled the Ethiopians to become members of the Italian Empire. Much school work proceeds on the basis of compulsion to this day. [Action is dominated by force and fear.]

**Second Level: Compromise**

Sometimes when two strong personalities, or two strong groups, attempt compulsion, they find that neither is strong enough to control the other. The only solution to the conflict is to combine forces on some plan which represents a solution satisfactory to both. This solution involves for each party to it the giving up of something that was desired in order to obtain something considered essential. It will be called *compromise*. Cooperation on the basis of compromise occurs in many situations in life. At the time this is being written the newspapers are hinting that China and Japan are about ready for compromise, since neither, so far, has been able to control the other. [Necessity rules here.]

**Third Level: Exploitation**

Man above all other animals is a thinking creature, and some men are more intelligent than others. The brainy man, unable to compel his neighbor to do his will, and not satisfied with the results of compromise, sometimes uses his brains *to trick* the other fellow into doing something that *seems* beneficial but in ultimate consequences *is* harmful. The classical illustration is the monkey persuading the cat to pull the chestnuts out of the fire. This type of cooperation will be called *exploitation*. [Trickery governs on this level.]

**Fourth Level: Bargaining**

A better way of getting others to assist one in achieving one's purposes is to pay them for their services; as when a teacher promises to read a class a story Friday afternoon if the class helps achieve the teacher's purposes during the week. Most of the cooperation of the world is carried out on this basis. It will be called *bargaining*. Each gives something, each gets something; each acts from voluntary choice; all are benefited, no one is injured.

It should be noted that the level of bargaining is the first level of cooperation on which the emotional concomitants are not evil. Compulsion, compromise, and exploitation *all* engender resentment, hatred, and the spirit of revenge. Under each of these three forms, cooperation ceases the moment the compelling force is removed. They are divisive forms of cooperation in that they tend to set the cooperators against each other.

Bargaining is individualistic, rather than divisive. In bargaining each acts for himself: there is no social unity, except at the moment of exchange. However, no evil emotions are aroused. Bargaining is merely a primitive form of *desirable* cooperation; the other three are

undesirable because they are divisive. [Reward is the controlling factor here.]

**Fifth Level: Leadership**

When a person of superior ability rises to the level of social awareness and group thinking, he comes to vision achievements that will be of benefit both to himself and to the group. He then explains his dreams to others and attempts by persuasion on the basis of reason to enlist their support for his cause. This level of cooperation will be called *leadership*. It is usually motivated more by the desire to be of service than by the hope of personal gain. Less able individuals consent to act under the direction of the leader so long as they are persuaded that his domination is for *their* interests as well as for his own. Leadership is of benefit to all concerned, demands unity of purpose, and injures no one. Its by-products are respect, honor, friendship, and further opportunity to be of service. [The service motive governs at this plane.]

**Sixth Level: Democratic Cooperation**

The highest form of cooperation, democratic cooperation, grows naturally out of leadership. It occurs when a group of individuals all achieve social-mindedness, and work together for the common good. . . .

Note that on the democratic level *each individual* is a leader, *each individual* carries full responsibility for the group achievement, *each individual* voluntarily performs his part in conformity with the adopted plan, even though a director may be necessary to coordinate the effort of the different individuals. Democratic cooperation is difficult to achieve because it makes such demands upon self-direction and self-control, but its benefits are correspondingly great. The mobilized brain-power of a cooperating group can solve problems that the ablest individual cannot solve unaided, and the combined physical power of the group can put plans into effect that no single individual can possibly put into effect. [The notion of brotherhood is here outstanding.] [1]

**Some dangers to be surmounted.** The problem of education in this domain, broadly conceived, is to move the pupil from the lower to the higher levels of co-ordinated group life, to establish in him a

[1] National Education Association, Department of Supervisors and Directors of Instruction, Committee in charge of the Yearbook on Cooperation, *Teachers and Cooperation*, Detroit, Michigan, S. A. Courtis for the Committee, 1937, pp. 7–9.

preference for some forms rather than others, and to equip him with competent command of the techniques of action on the highest levels he can reach. Such a comparatively "simple" matter as understanding another person's point of view is an exceptionally mature achievement requiring changes in attitude, self-mastery, insight into one's own motives and those of others, and an ability to test hypotheses empirically — in other words, the essentials of a liberal or a scientific education in itself. Yet young children still in the elementary grades can be taught to state another's position so clearly that he will accept their formulation of his standpoint — the critical test presumably of their power of understanding a rival orientation.

Of course, the step just mentioned is merely a preliminary to the harmonization of conflicts. If the will to find a solution acceptable to all interests exists, some "formula" that will reconcile and embody all major demands of apparently rival groups will be forthcoming. The opportunity to play diplomat in a constructive way exists in all children's associations and the study, use, and criticism of successful and unsuccessful methods for ironing out difficulties between persons and groups can be made an integral part of every school program. Teachers have long ago discovered that they need every insight into behavior that psychology can provide; is it not equally true that pupils in their own way need all the suggestions about themselves or their neighbors which a system of self-direction requires?

The systematic effort to improve the group life of school children does sooner or later raise this basic question, "How social-minded can or should anyone be?" Judgment must take the place of exact data in dealing with this query since much needed information is missing. Too little sensitivity to either major social issues or minor local group problems indicates immaturity in an important area should such sensitivity fail to develop after a reasonable age or following some pertinent experiences. However, an excessive awareness is hurtful to an individual's serenity, particularly when the capacity to grapple effectively with the problems is lacking, either because the problems are literally too vast or because the learner's emotional responses have grown faster than his ability to solve group difficulties. Many fine

adolescents do suffer from a crippling *Weltschmerz, i.e.*, they are overwhelmed by "the burden of the world's woe" and the appeal to their sympathies evoked by the miseries of others. They are in a chronically unhappy mood, owing largely to the recognition that they are powerless to assist in any important way. Even more serious is the reaction to the rebuffs that may come to certain tentative efforts to be helpful and the dawning recognition that the world does not welcome the social-minded. This may cause a retreat to an asocial phase in which the person responds bitterly to others' problems, "Stew in your own juice," "Why try to save those who don't appreciate being saved?" etc. Premature cynicism and "hard-boiled" attitudes thus result from the frustration of originally generous impulses.

The only possible cure for this serious weakening of morale is some sort of rest to remove the strain of serious disappointment, a temporary escape into other areas of human interest, and the achievement of a new perspective on the possibilities of working for the collective welfare. A distinction between short-term and long-term aims may foster the recognition that the former are easier to realize, but that the latter provide the motivating force. The attitude "I can't do everything, but I can do something" may take the place of the earlier unchecked enthusiasm. Manageable successes can be arranged to take place, so that emotional sensitivity, insight into possibilities, and overt mastery may all grow apace. This is perhaps the only "Golden Mean" that can be reached in an age of increasing stress and strain.[1]

## EDUCATION FOR LEADERSHIP

The improvement of group behavior is in part determined by the nature of the leadership which each group possesses. A leader in any organized activity is any individual who conspicuously affects the course of conduct followed by the group. Things happen in social living all the time; those who make them happen and who direct them

[1] A dozen or so psychologists were recently asked by one of their number whether the decade from 1940 to 1950 would demand more or less personal and social readjustments than the turbulent decade from 1930 to 1940. They were all unanimous in predicting a decade of intensified insecurity ahead.

in one path rather than in another are persons exercising a leadership function whether they are recognized as such or not.

No individual is worthy of admiration just because he is a leader. This is a common mistake of those who are disposed to esteem anyone who stands out from among his fellows, regardless of the reasons for this prominence or the actual social worth of his leadership. Much leadership activity is a tragic waste of human energy and talent and much is also a disservice to either the immediate social group being led or to the race as a whole. Tamerlane was a great military leader with exceptional ability in razing cities and slaughtering their inhabitants. By contrast, George Lansbury, the English pacifist, was gifted with unusual powers of making himself liked even by those who strongly opposed his influence and who did everything they could to defeat his purposes. Discrimination is needed in appraising leadership even if one does no more than call attention to the ills that some business leaders have caused, the grave national disasters precipitated by eminent statesmen, and the sins of omission and commission of distinguished educators!

Despite these precautions, it is nonetheless true that the betterment of group life and the betterment of leadership are interdependent processes; education consequently is interested in the producing not just leaders but leaders who will help the group achieve its most important values. Every member of a group, no matter how small or large it may be, who actively engages in this process is literally a leader. Psychologically as well as ethically it is much more correct to take this latitudinarian view of leadership than to conceive of it as inherently and necessarily restricted to a few with "gifts" of leadership. This latter view is out of harmony with those studies which show that social or group leadership — the kind that is usually meant when the term is used without any special modifier — can be increased by instruction in its technique. One pioneer study [1] in this area consisted in taking two matched classes of secondary-school pu-

[1] G. A. Eichler and R. R. Merrill, Can Social Leadership Be Improved by Instruction in Its Technique? *Journal of Educational Sociology*, 1933, 7, 233–236.

pils, none of which contained obvious " leaders," and giving one group the benefit of eleven 30-minute conferences on various qualities and techniques of student leadership spread over a 7-month period. At the close of this training period, the individual ratings for leadership (made by judges who knew the pupils well) were repeated; the differences in the " impression " of leadership as revealed by the initial and final ratings for this trait were computed with these results:

| | |
|---|---|
| Mean gain in score of experimental group | 0.976 |
| Mean gain in score of control group | −0.71 |
| Difference in favor of the experimental group | 1.686 |
| Chances that the true differences are greater than zero | 12 to 1 |

This difference is not particularly impressive, but it is suggestive of what might be done under circumstances where leadership skills are brought to the front.

**Specific developmental problems.** Leadership training can profitably be given to all children with resulting benefits to themselves and the groups they affect, but the development of the leadership role in very bright youngsters is apparently an exceptionally acute pedagogical problem because of the difficulties in winning acceptance by those of lesser understanding. The late Leta Hollingworth was deeply concerned with the early selection and training of potential leaders and found that these children were faced with certain adjustment problems peculiar to themselves, all of which stood in the way of effective group leadership. Chief among these were the following needs:

1. Finding enough hard and interesting work at school.
2. " Suffering fools gladly," thereby excluding misanthropy, bitterness, and disillusion.
3. Avoiding a negative attitude toward unenlightened authority.
4. Resisting the tendency to withdraw from the mass, isolating oneself, and becoming a " hermit."
5. Preventing the development of deceptive practices and chicanery in dealing with the less competent.

Failure to make the conduct accommodations implied in these

five items means that the personality of a prospective leader is damaged, perhaps severely enough to injure his own happiness and to deprive his fellows of the guidance he might otherwise provide. The failure of the group to work constructively with a pupil of superior gifts means that the class as a whole needs to acquire more insights in this delicate sphere of human relations. It will not do to train the leaders only and to neglect the problem of sensitizing the "nonleaders" to recognize, and work co-operatively with, possible leaders. The following incident from life in an experimental school shows how important both factors are in improving the social behavior of the members of a classroom:

An eleven-year-old boy, of I.Q. close to 180, decided to run for the office of class president in the senior high school to which he had been accelerated. His classmates were around sixteen years of age. During the electioneering a proponent of a rival candidate arose to speak against the eleven-year-old; and he said, among other things, "Fellows, we don't want a president in knee pants!"

In the midst of the applause following this remark, the eleven-year-old arose, and waving his hand casually in the direction of the full-length portrait of George Washington on the wall, he said, "Fellows, try to remember that when George got to be the Father of our country he was wearing knee pants."

Our eleven-year-old was elected by a large majority. He gave evidence not only of an I.Q. of 180, but also of the additional qualities of political leadership in highest degree: audacity, presence of mind, good humor, grace, and above all, the genuine desire to be a popular leader. He knew how to bridge, by a debonair gesture, the great gap between him and those to be led.

I say this boy had qualities of *political* leadership. This limiting adjective opens the large subject of the different kinds of leaders. Leaders of whom, and for what ends? Observation of children suggests that there is a direct ratio between the intelligence of the leader and that of the led. To be a leader of his contemporaries, a child must be more intelligent, but *not too much more intelligent*, than those who are to be led. There are rare exceptions to this principle, as in the case we have cited. But, generally speaking, a leadership pattern will not form, or will break up, when a discrepancy of more

than about 30 points of I.Q. comes to exist between the leader and the led.

This concept of an optimum which is not a maximum difference between the leader and the led, has very important implications for selection and training. Among school children (as among the peoples of all times), the great intellectual leaders are unrecognized, isolated, and even ridiculed by all but a few, in the ordinary course of mass education. They can develop leadership of their sort only when placed in special classes.[1]

It is significant that in children's societies, just as in the adult life of the community, the "institutional" or acknowledged group leader must be somewhat more intelligent than the mean of his followers — but not too much so! Apparently ability beyond a certain level is a handicap in reaching positions of social control. The result is that genuinely superior capacities either go to waste or operate indirectly in the improvement of group relations by what may be called the "brain-trust" technique. Thus, an IQ of 180 would have difficulty in influencing directly a group with a mean IQ of 120 (a figure equal to that of most college graduates) but he could accomplish his ends by affecting the behavior of a person with an IQ of 150 who happened to play the role of group leader. This technique of using an intermediary to relay the proposals for action to the "lower" levels of comprehension by adjusting the form and language of the program to different planes of understanding is apparently the only way that exceptional mentalities can exercise their beneficial influence.

**Relation of leaders to their supporters.** Nothing that has been said in this section should be construed as an abandonment of the viewpoint outlined in Chapter 6, where we accepted what is now usually characterized as a "field" or environmentalist interpretation of intelligence. The relative isolation of the superior personality in group affairs can be made less marked in the long run by lifting the mean IQ of the population through the educational reconstruction of

[1] Leta S. Hollingworth, What We Know about the Early Selection and Training of Leaders, *Teachers College Record*, 1939, 40, 580–581.

its behavior and the social reorganization of the forces that influence its growth. A field theory of leadership belongs in this general thought pattern, since a functioning leader is made such as much by the properties of the group he guides as by his own traits. A leader must incarnate in some way the premier values of the group with which he is identified and actually express them better than most of his followers (better, "associates"). Only then does he stand any chance of being elevated to a position of leadership and of maintaining it once he is there. A *social* leader — to distinguish this type from the purely *intellectual* leader — cannot serve as leader if he is too far ahead of his group or too far behind: There must be a nice congruence between the goods he symbolizes and advocates and the goods currently being sought by his "constituency."

In all discussions of leadership there is the danger of contrasting a restricted "élite" with a great "mass," usually with some contempt implied for the latter. Morally and technically, such a view rests upon a misconception of the relation between the two. *The leader is always the creature of the group.* If he is, on the average, physically more impressive, brighter, more energetic, more expressive, than his fellows, then he is their leader only because they prize these traits not just in him but in themselves. Most leaders simply embody more prominently the existing values of their group; it is a rarer and higher form of leadership which tries to change these values themselves. Educators have both functions to discharge, a fact which makes teaching a more basic social act than is customarily realized.

Within the life of the schoolroom, master leadership is normally in the hands of the teacher, but one of his duties as a molder of personality is the encouragement of this capacity in *all* the pupils. No one rightly can claim a monopoly of leadership any more than a single pupil may properly have exclusive access to the dictionary. Both opportunities are necessary to full development. Rotation in office, such as providing every pupil with a turn at the role of chairman, regardless of age, sex, or even ability in this capacity, is a sensible procedure; the "followers" learn from this what the strains and de-

mands upon leadership really are and the "leaders" appreciate upon what a small margin of superiority in skill their actual role depends. Leadership thus comes to be recognized as a kind of division of labor upon which all advanced societies rest — it is simply competence and expertness in a given area. By means of leaders in different sectors of action, the group gets its work done better than it would without them. Leadership, at least of the educative sort, does not mean "bossing" others — it means serving them because one is in a key position to gratify their wants as well as one's own ego needs. This is the perfect combination for satisfactory group relations.

## SUMMARY

The direct improvement of the group life of young people centers about the attainment of proficiency in the "machinery" of co-operation and leadership. Simple "dominance" and "submission" reactions, the usual methods of arranging orderly associative practices, will not lead to better social behavior than already exists because the personalities of the participants are not adequately expanded under these conditions. The psychological justification for democratic behavior lies in the lowered amount of frustration of personal goals which results for most participants. Not that the co-operative technique is lacking in certain special thwartings peculiar to itself, owing largely to the failure of full co-operation to occur. Nonetheless, the empirical studies of democratic and autocratic atmospheres point decisively to the greater happiness and achievement of learners under the former "social climate." The full significance of this for educational practice is still to be appreciated.

Social-mindedness among students at all levels occasionally encounters barriers in the defective sensitivity of associates and in the uneven development of adaptive techniques alongside the growing emotional concern of the individual. Teaching that seeks to better social behavior must not overwhelm the learner with the vast "problem" nature of collective affairs, but ensure successful manipulation of such situations on a small scale. The preservation of the morale

of the pupil who wants to "do something" about poverty and war, for example, requires the introduction of a time perspective and a sense of practical possibilities lest he be driven to despair and a nihilistic mood by the constant thwarting of his benevolent impulses. Such "frustrations of a higher order" must lead to renewed study of the properties of social groups and to an objective outlook upon one's own frustrations before the difficulties they present can be surmounted.

In all group activities the issue of leadership arises. Training pupils for co-operative and democratic living also demands practice in the discharge of the leader role, since every person is a leader of some group under some circumstances. Experimental evidence supports the view that the leadership capacities of every pupil can be raised by instruction in these functions; it is a field property of the organism and is therefore modifiable by appropriate transformations in the social field. The mental hygiene of a group is fostered by the rotation of leadership duties, so that no member is permanently excluded from a key position of influence over his associates. In general, this chapter is to be viewed as co-ordinate with the preceding one, for the improvement of character and personality goes hand in hand with the betterment of social behavior; education cannot deal separately with matters which man's nature has made one.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Is there any difference between conflicts between individuals and conflicts between groups? Specify.
2. What adjustment problems arise whenever a person finds himself "out of step" with most of his fellows?
3. Is the school at present any better equipped than society as a whole for dealing constructively with the nonconformist in its midst?
4. How can the educational system effectively work toward the establishment of co-operative tendencies among pupils when the adult life of the community is predominantly competitive? Is there any way of making a "painless" transition from one behavior pattern to the other?

5. Does pupil self-government help to make the institution of education serve better the needs of the personalities affected by it? Illustrate.
6. Distinguish in at least three important psychological respects between a "*laissez-faire*" classroom or work situation and a comparable "co-operative democracy."
7. A common limitation of most compromises is their markedly temporary nature. To what do you attribute this? What conditions must they meet in order to be more enduring?
8. Outline a program for developing the leadership capacities of every pupil in an ordinary American high school. State the theoretical basis of your plan and of the methods that flow from it.

# PART THREE

## ADAPTATION OF INSTRUCTION TO DEVELOPMENTAL LEVELS

# *INTRODUCTION*

In Part I we sought to define the systematic approach to problems of education which seems characteristic of the contemporary psychologist. This scientific and professional viewpoint is a complex resultant of a varied lot of theoretical, experimental, and practical experiences, some of the most significant of which lie outside the domains of education and psychology as these areas are usually understood. In Part II the broader orientation previously established was specifically directed toward the elaboration of the central pedagogical theme of "improvement." The betterment of the major functions of the human organism through the school was seen to depend chiefly upon the teacher's ability to control the field conditions governing the transformations in individual behavior he is seeking to produce. Part III is needed to round out the picture of an applied educational psychology by outlining some of its major contributions to the efficiency of teaching and learning in administrative school units organized according to age differences or subject specialties.

The content of educational psychology at present is so extensive that it is easy to forget that this field of knowledge is itself almost entirely a product of the twentieth century. The first important systematization of this area appeared in 1914 with the completion of Thorndike's three-volume work. The pattern he followed is indicated by the titles of each volume in the set: Volume I dealing with "The Original Nature of Man" according to the instinct hypothesis and elaborating the educational significance of native traits; Volume II (the real heart of the series) expounding the fascinating and provocative connectionist theory of learning; and Volume III treating the statistical materials pertaining to "individual differences" (really

*group* differences) from a strongly hereditarian viewpoint. This triple formulation dominated the thinking of most educational psychologists for almost a quarter century, although the theoretical basis was challenged from the very start by the rival schools of behaviorism and psychoanalysis and somewhat later by the gestalt and organismic trends. Within the last decade the formidable Thorndikian structure has proved insufficient for the rapidly expanding territory of educational psychology. To be as "definitive" now, one would need at the very least to add: A Volume IV devoted to mental and educational tests and measurements; a Volume V on child development; a Volume VI on the psychology of the various school subjects; a Volume VII on the psychology of the classroom; a Volume VIII on the psychology of the teacher; and probably a few others of approximately equal importance to the work of the modern school. During the last decade a number of educational psychologists have attempted to synthesize their subject on a basis noticeably different from that earlier employed, partly in order to do justice to the rapid expansion of their work and partly to accommodate its recommendations to the social and philosophic innovations represented by the "progressive-education" movement. As a result, a more miscellaneous body of material has crept into educational psychology, some of it attributable to the modernization efforts of those workers who feared that educational psychology would otherwise become a strictly academic or scientific specialty divorced from the realities of everyday pedagogical endeavor and some traceable to the pressures of colleagues in various forms of educational service who wanted expert psychological help in meeting the immediate problems of their crafts.

All these influences converge about the general problem of *methodology*. Teaching procedures can be investigated with the same detail that learning modifications in the pupil can be studied — indeed, the complementary nature of the two "events" makes it impossible to deal fully with each in complete separation from the other. To the psychologist "methods" are themselves interesting modes of response: Functionally they correspond to the "path" taken by an

animal in moving toward some goal. It must never be forgotten that when a teacher is managing a group of pupils, he is solving constantly a variety of momentary or persistent problems, such as: How can I keep this class busy and happy during the next hour? What topics in this area will be most interesting to the girls? When should this principle be introduced? Why did the class do so well in English usage and so poorly in the social studies on a national-achievement test? How can Robert be induced to participate more actively in pupil discussions? Etc.

Educational psychology is concerned, to some extent at least, with the specialized technology implied in the phrase "teaching methods" because these questions are answerable only in terms of the changing properties of the human organism. This does not mean that it can claim to answer every specific point that teaching experience raises, such as the recent normal-school graduate's favorite confession of disciplinary inadequacy, "What can I do to prevent the boys from throwing spitballs at each other and making funny noises with their throats?" These disconcerting phenomena of adolescence are interesting bits of behavior and just as worthy of scientific attention as any of the soberer matters with which investigators commonly concern themselves. However, educational psychology is not just a bag of routine tricks for dealing with the standard "emergencies" in a teacher's life; neither is it a loose body of principles devoid of direct practical utility. It is, on the contrary, perhaps best envisaged as itself a methodology for dealing with problems of educational method! Every teacher to some extent is therefore a practicing educational psychologist whenever he tries to solve the minor cases of "human engineering" that school work presents. At any rate, this is the position developed in the chapters now before the reader.

# Chapter 14

## PSYCHOLOGY APPLIED TO PROBLEMS OF ELEMENTARY EDUCATION

By the time that a child comes under the care of a school teacher, much — some would say " too " much — has already happened to him. Parents, brothers and sisters, playmates, and informal contacts with adults in the neighborhood have all taught him many things which in the aggregate may have changed him more than anything that compulsory and regularized education can ever approach. His life is already well advanced and basic learnings definitely established before books, the characteristic implements of organized education, become meaningful sources of stimulation to him. That type of mental growth which is mediated by the printed page is not as dominant in the schools of today as in those of a generation ago, for other channels of impression and expression are now more widely utilized; nevertheless, " book learning " is, and will probably rightly continue to be, the principal reliance of educational workers in promoting the cultural development of the young.

### A POINT OF VIEW ON READING

In Chapter IV on the Life Cycle, the opinion was expressed that the two most important achievements of the preschool child are the mastery of the acts of walking and talking, both of which normally occur between the first and second birthdays. Nothing comparable to these abilities appears until the child learns to read; this is the third great accomplishment of the organism. The reading act contributes so much to the pupil's future course of development that failure to

perfect this achievement practically debars him from easy access to the content of most fields of knowledge.

One of the first important psychological issues that arises in the teaching of reading is the question of "reading readiness." When has the child arrived at such a stage in his maturation that he is prepared to read? This is a subtle problem, affected, like all matters in educational and genetic psychology, by the influence of individual differences and by the dependence of a state of "readiness" for anything upon a delicate fusion of inner and outer conditions. The average child at the age of 2 years is not "set" to read despite his interest in picture books, presumably because the letter and word symbols are not yet meaningful enough to him. Of course, he "sees" them as well as he ever will, and a bright child of that age can be taught to identify certain shapes such as N and Z (these two capitals are often confused because the up-down and left-right axes are not originally part of the youngster's object perception; in an "absolute" sense, these letters are alike and the child is literally correct in identifying them as the same pattern). Many of the "ingredients" of the maturer reading performance are thus present in the miscellaneous body of concrete experiences that every normal preschool child undergoes. Eventually, he sees "dog" as a strange set of symbols printed above and below an actual picture of this familiar animal, and one of the most fundamental properties of mind — the ability of the part to reinstate the whole — does the rest of the mental work required. He learns the word in much the same way that we get acquainted with persons who were originally strangers, *viz.*, through an introduction via old acquaintances. Establishing "reading readiness" is largely a matter of building up a stock of these "old acquaintances."

There is some ambiguity involved in determining what shall be considered as evidence of reading skill. Can a child read when he recognizes his first name in print? Is he a reader if he knows that A is A, B is B, and C is C? Or shall we defer such a claim until he correctly reads and understands a full sentence such as, "Fanny has an apple"? This last function makes more severe intellectual demands

and suggests that a certain maturity in the perception of what may be termed "logical relations" is a prerequisite to genuine reading.

**Reading as a function of the maturation of other processes.** Such a view is supported by the results of an experiment on the learning of certain common thought patterns performed under the direction of the present writer. Two hundred children between the ages of 5.0 and 7.6 were tested to see if they already understood or could learn such simple standard logical relations as the whole-part, part-whole, action-agent, agent-action, attribute-substance, substance-attribute, genus-species, and species-genus. The technique followed by the examiner with each special relationship may be illustrated by the whole-part section below:

1. "Would you like to play a game of 'whole-part' this morning?" After the child's assent, the examiner continued: "Do you know what whole-part means?"

A

2. To a *negative* answer, the examiner said, "Yes, you do. Tell me what is part of an *apple*."

To an *affirmative* answer, the examiner said, "All right, tell me what is part of an *apple*."

3. To an incorrect answer, the examiner said, "No, you are wrong, that is not part of an apple. Now tell me what is part of a *clock*."

To a correct answer, the examiner said, "That's right, now tell me what is part of a *clock*."

B

4. To an incorrect answer, the examiner said, "No, you are wrong. Now listen, part of an apple is a seed; part of a clock is the hands. Do you understand?"

To a correct answer, the examiner said, "That's right, part of an apple is a seed; part of a clock is the hands. Do you understand?"

C

5. To a negative answer in question 4, the examiner said, "Well, I'll see if you do. Tell me what is part of a *book* (*hat, pencil, hand, dog, chair, train, house, automobile, shoe*)."

To an affirmative answer the examiner said, "All right, I'll see if you do. Tell me what is part of (the words listed above)."

*D*

6. As the words were given to the *S* and he returned his answers, *E* acknowledged them with a " right " or " wrong." If *S* did not show by his answers to the first 6 words of the test list that he understood the relationship, the examiner again told him the correct answer to *apple* and *clock* and then repeated the first 6, saying " right " when a correct answer was returned and supplying the correct answer when an error was made. The remaining 4 words were given without any correction or comment on the *S*'s replies.[1]

The manner in which these relationships were acquired is important for the theory of learning. Mastery was not a slow, gradual process but usually occurred swiftly (if it transpired at all) and a permanent acquisition resulted. When the desired concept was once formed, the child responded with 100 per cent accuracy to the remaining words illustrative of the general relationship involved, provided always that they were within the range of his vocabulary. This finding confirms an earlier inquiry which dealt with the single relation of opposition only. Dallenbach reported an effort to teach three children the meaning of opposition.[2] He met with immediate success in the case of a 6-year-old and complete failure with a 3-year-old. Another child 4½ years of age did not learn the relationship at first but did later when insight into the task appeared. In a sequel to this study, Dallenbach and Kreezer performed under standardized conditions, a similar experiment of broader scope.[3] They found that children of the social status of the selected group learn the meaning of opposition without any particular instruction concerning it by the end of their 8th or at the beginning of their 9th year. Children of a 5.3–5.9-year age group have, however, a probability of 0.5 of learning the relation with a small amount of instruction. Those who do

[1] Mary Schooley and George W. Hartmann, The Rôle of Insight in the Learning of Logical Relations, *American Journal of Psychology*, 1937, 49, 288–289. Quoted by editor's permission.

[2] K. M. Dallenbach, A Note on the Immediacy of Understanding a Relation, *Psychologische Forschung*, 1926, 7, 268–269.

[3] George Kreezer and K. M. Dallenbach, Learning the Relation of Opposition, *American Journal of Psychology*, 1929, 41, 432–441.

master the problem seem to do so not gradually (as required by trial-and-error theories of learning) but "insightfully," *i.e.*, by a process involving a "sudden" solution of the difficulty.

A matter of even greater significance for the problem of reading readiness lies in discovery that *all these logical relationships seem to ripen about the same time.* The median child can understand and use these relations with verbal materials between the age of 5.1 for the easiest and 6.10 for the hardest type. This narrow age range of less than 2 years indicates the close genetic interconnections of all the major or common logical patterns among words and ideas. Since even the simplest propositional kind of reading makes use of most of these relations, it is small wonder that most researchers find that a child should have a mental age of at least 6 (which a normal child of calendar age 6 would have) before first-grade text material can be profitably undertaken.[1] Conceptual immaturity and not perceptual difficulties is what delays the emergence of reading to its usual date.

The different heights of the columns in Figure 51 show the relative difficulty range for the various relations studied. Children of the age group 5.1–5.7 are able to learn the easiest of the relations while they must belong to a 6.4–6.10-year age group to learn the most difficult of the relations with the amount of training given our group. The relations themselves vary in the following order from easiest to hardest as measured by the increase in the age limens: Action-agent (5.4), agent-action (5.4), attribute-substance (5.10), genus-species (5.11), whole-part (5.11), part-whole (6.1), and species-genus (6.7).

If certain simple relations must be meaningful orally before ordi-

[1] Much harm has probably been done by expecting every child of 7 to be interested in the printed page and to have made substantial progress in the use of letter symbols. Every encouragement in this direction, of course, should be given, and the positive correlation between reading ability and intelligence is always significant; but it is only when a child reaches his 10th birthday without wishing to read or being able to do so that the problem of retardation becomes acute. There is considerable evidence to indicate that deferring reading instruction until the 2nd grade makes for better adjustment and more rapid learning without any loss in eventual competence. Other school subjects besides reading yield similar results when the "timing" is bettered.

nary prose can be read in print (because reading is essentially an act of thought), then the best way to create reading readiness is to equip the child with the direct concrete contacts and ideas to which reading as a symbolic performance indirectly refers. When a child's intellectual world has expanded to include the actions, objects, and qualities about which he is going to read, then he is prepared to use these

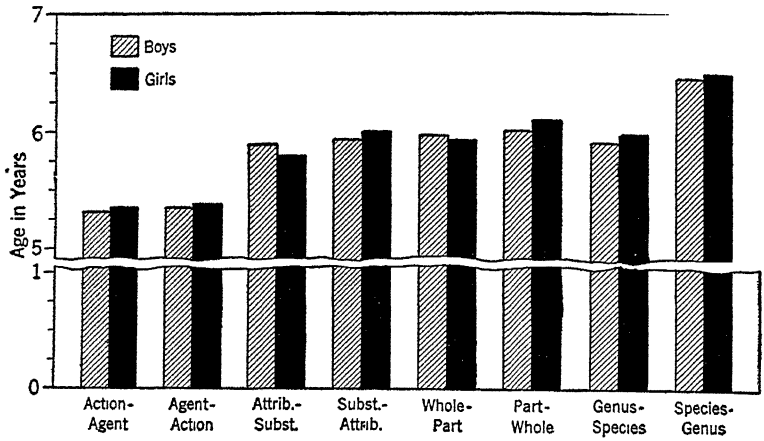



FIGURE 51

Comparison of the limens for the different relations.

substitute signs for the reality that he knows through other more immediate channels. Thereafter he can use this medium to acquaint himself in useful ways with things that he may never verify through the senses, such as learning about Japanese history without ever seeing Japan. Reading thus permits one to communicate widely and greatly increases the sweep of vicarious experience from which the learner may benefit. It is *the* language art *par excellence.*

**The "wholeness" of the reading function.** Another important psychological truth about reading as a mental function appears in the apparent paradox that children can learn to read without knowing the individual letters of the alphabet. It is, of course, highly desirable that the order of the alphabet be eventually acquired, but these letters are best *differentiated* from the word totals in which they are originally embedded. The entire visual complex of "boy" can be

perceived and properly pronounced without the ability to analyze the word into such components as " b+o+y." The same is true of even much longer and rarer words. Over a century ago, Horace Mann remarked:

The general practice is founded upon the notion that the learning of letters facilitates the correct combination of them into words. Hence teachers drill children on the alphabet until they pronounce the name of each letter at sight. And yet, when we combine letters into words, we forthwith discard the sounds which belonged to them as letters. The child is taught to sound the letter *a* until he becomes so familiar with it that the sound is uttered as soon as the character is seen. But the first time this letter is found, even in the most familiar words, as in *father, . . . apple, peach, walnut, hat, . . .* etc., it no longer has the sound he was before taught to give it, but one entirely different. And so of the other vowels. In words, they all seem in masquerade. Where is the alphabetic sound of *o* in the words, *word, dove, plough, enough, other*, and in innumerable others? Any person may verify this by taking any succession of words, at random, in any English book. The consequence is, that whenever the child meets his old friends in new company, like rogues, they have all changed their names. Thus the knowledge of the sounds of letters in the alphabet becomes an obstacle to the right pronunciation of words; and the more perfect the knowledge, the greater the obstacle. The reward of the child for having thoroughly mastered his letters is to have his knowledge of them cut up in detail by a regular series of contradictions just as fast as he brings it forward. . . . We teach an honest child to sound the letters, *e, y, e*, singly, until he utters them at sight, and then, with a grave face, we ask him what *e-y-e* spells; and if he does not give the long sound of *i*, he is lucky if he escapes a rebuke or a frown. Nothing can more clearly prove the delightful confidence and trustfulness of a child's nature than his not boldly charging us, under such circumstances, with imposition and fraud.[1]

Apparently practical pedagogy was configurationist in its thinking long before psychology provided it with a basic rationale. The whole

[1] Horace Mann, Second Annual Report of the Secretary of the Board of Education, 1838, in *Life and Works of Horace Mann*, Vol. II, pp. 531–532, New York, Lothrop, Lee, and Shepard Company, 1891.

has properties that the parts do not have. If these are arbitrary or artificial parts they are distinctly harder to use than certain "natural" wholes. Thus, "She has a book" can be read as a unit as readily as "she" or "book," and these last two can be as quickly discerned as "s" or "k." The short sentence has the maximum of meaning to the child, and the alphabetical signs the least. The word or sentence method of teaching reading has now all but universally supplanted the older alphabetical technique. It is only when the child himself seeks to write or to spell a word that the analysis into letter components must be made.

**Values in "case" studies.** In dealing with pupils who have reading difficulties, it is worth noting that this skill is best viewed as a part aspect of the total personality organization. The general social and life adjustment of the pupil affects his school work, which in most elementary schools is built almost entirely about reading. Consequently, diagnostic and remedial treatment of retarded cases cannot concern itself exclusively with peripheral symptoms of deficiency; home and neighborhood factors are often the key items in blocking improvement. There are cases where remedies centering about better handling of the "mechanics" of reading are all that is needed, but there are others where mental-hygiene influences alone will serve as correctives. The following record shows what can be done through this approach:

*Case 2*, G. R. — C. A. — 12.6 yrs.; I.Q. — 61 (language handicap), P.Q. — 68. Grade — 3.

G. was born in Italy and came to New York only last year. She entered present public school last year and was then placed in the second grade. This year she was promoted to 3B and is now referred by her teacher as a reading disability case.

G. has two sisters; one is aged 9 and is reported doing well in school (second grade), the other is 15 years old and not doing well. The children seem well cared for. G. is attractive: medium stature, dark hair, large dark eyes. She is well-nourished and is always clean and well-dressed. She is amiable and pleasant and, except for occasional colds, has a good health record; eyes and ears are reported nor-

mal. The family speak only Italian. The teacher reports parents as cooperative; because the mother speaks no English and there is a young baby, the father comes to the school.

*G.'s attitude towards reading.* — G. is not lacking in interest in reading. She approaches a book eagerly, grasps directions quickly and goes right to work with interest. She points to each word with her pencil and re-reads each word that she does not know. When puzzled she gives a big sigh and tries again. She seems to use context as a clue. When she saw a picture of snow falling, she laughed. She is easily confused when there is much to handle at the same time. She is always aware of her failures.

*Characteristics of reading and writing habits.* — G.'s scores on the Gates Primary Tests were (in grade terms): word recognition 2.20; sentence reading, 2.55; paragraph reading 2.10; average grade score 2.28. This is 1.32 below her grade position and 4.52 below her chronological grade position. In view of her language handicap and her apparent lower intelligence level this is not surprising. A further intelligence test when she is more familiar with English may show a higher rating. She is handicapped particularly by her backwardness in *spoken* English, so that the reading of many words has no meaning to her. On the Gates Oral Context test she had an E score, making 20 errors out of a total of 33 mispronunciations with 2 reversals. She is a slow, studied word reader. Her foreign accent is a decided handicap as it changes the correct sound of the words and letters and can be only confusing to her; for instance she pronounces " i " as " ee " is pronounced in " peek " so that " is " becomes " ees."

In the Visual Perception Techniques vowel-consonant phonograms were sampled. In naming capital and lower case letters, she made no errors; her speed here was at the second-grade level. In Auditory Perception Techniques, she scored zero as she obviously did not know the letter sounds nor how to blend them. Her foreign language pronunciation is a real handicap. She was able to repeat all the nonsense words, showing that she has no defects in auditory discrimination. Spelling and Writing tests reached M and H levels respectively. She spelled 6 out of 10 spoken words correctly and wrote all the spelled words correctly. She is particularly weak on word endings, better on word beginnings.

*Remedial work.* — On the first day when the teacher asked her to go with the worker, G. was shy and hesitated. She was reassured as soon as the teacher explained that the worker spoke a little Italian.

Her face brightened when she heard a few words of Italian and she seemed surprised. The worker told her that she knew it was hard to learn another language and was anxious to help her. On the first day she was given Gates Primary reading tests. She seemed interested, grasped directions quickly, and went right to work.

It seemed to the worker that G. needed much experience of the English language in order to build up quickly a functional and useful vocabulary whereby she could express herself orally and acquire a better enunciation and pronunciation. With this in mind, it was decided to let her work with *M.*, a boy with somewhat similar needs.

Both children were intensely interested in Merton-McCall's Pupil Activity Primer which they found on the desk. Both showed such interest in the attractive illustrations that the time was spent talking about the pictures and the names of the children in the story, etc. From this as a point of departure, they went right on reading in the story and carrying out the activity suggested in the book. Both of them were entranced with the material in the book and enjoyed the social situation and the challenge of working together. They frequently helped each other out spontaneously.

G. is friendly, talkative, and cooperative in this situation. Her attitude is an interested one and she is eager to get all the help she can in learning the English language and in learning to read it better. Both children have become spontaneous in this situation. G. seems able to express herself better even after three weeks of daily periods of 45 minutes in length. Her pronunciation still needs improvement, but she seems to have a better grasp of vocabulary. Her outstanding weakness of skipping word endings has improved too, although she often omits an "s," giving the singular instead of the plural form. She is aware of this and is often reminded by the boy and sometimes corrects herself. Her spelling, which was very low-grade in school, as low as 20, 30, and 40 percent in class marks, improved when the words in the spelling book were used for practice in syllabification, beginning and ending sounds, letter sounds, and similar elements. There is distinct improvement in their spelling; G. reported an 80 and a 95 in this subject, much to the delight of both children, who shared each other's triumphs.

On a Gates retest after 3 weeks of work, although there was no improvement in word recognition, there was an improvement of .65 of a grade in sentence reading and an improvement of .4 of a grade in paragraph reading. G. does not now use her lips in silent reading

and never points with either her pencil or finger. What she reads she enjoys and reads fluently.

## WRITING AS A PSYCHOLOGICAL PROBLEM

Handwriting or penmanship is basically a motor skill involving the integration of many standardized letter forms. As a neuromuscular function it matures as soon as the finer finger and wrist movements have emerged from the larger arm movements to give more delicate control over manual reactions. For this reason, the first efforts of the pupil in writing should be confined to larger or grosser movements in which the arm swings from the shoulder. This can easily be accomplished through blackboard work. The "naturalness" of this sequence appears in the fact that handwriting follows after, or differentiates out from, a large amount of previous drawing and incidental marking with chalk, crayon, or pencil. These may be mere scratches or fairly exact reproductions of the objects represented. The rounded or straight lines used in the general "sketching" activity of the preschool youngster are the materials that appear again in the evolution of the writing act.

A substantial research literature concerning the relative merits of manuscript (*i.e.*, "print"-like) writing and cursive (or connected and rounded) handwriting exists. The two forms are not really very different in nature, and consequently there is little wonder that such small and uncertain differences in children's behavior result from them. The chief advantage of manuscript writing lies in its obvious resemblance to the cast type letters the pupil encounters in his reading. The learner usually has a model available for any writing he wishes to do since all he need do is to reproduce the general shape of the letter minus the differential shadings and serifs attached to most type letters. The "o" in the form of handwriting is merely a contextual transformation of the "o" often used earlier in drawing eyes, heads, etc.; there is no new motor co-ordination to be achieved. Genetically, manuscript writing should be viewed as a more primitive form of writing even though its legibility and beauty are as good as

most cursive writing can show; except for the demands of speed, there is no inherent reason why cursive writing should ever have arisen — the latter is produced from the former by the decreased separateness of the component letters created by not lifting the pen or pencil from the writing surface. Psychologically, therefore, manuscript writing may be recommended as standard practice during the early elementary grades, but by the time junior high school begins the transition to cursive writing should have been completed. The principal limitation of cursive writing is the temptation to blur the individual parts and let the general form of the word or phrase carry the intended meaning. Whenever accuracy in communication via penmanship is of peculiar importance, there is a tendency to return temporarily to the manuscript norm for the added emphasis and clarity this may create.

**A critique of "formalism" in handwriting.** Another nice psychological point appears in appraising the various commercialized systems of penmanship, of which the so-called Palmer method of instruction is the best known. In some states elementary teachers have been required to qualify themselves for a minimum Palmer certificate on the reasonable assumption that the handwriting model displayed by the instructor to the class should be of better-than-average quality. However, the specialized movement drills which the Palmer "system" stresses have certain limitations which a critical educational psychologist must mention. First, the dogmatic insistence upon exclusive arm rotation and the rigid immobility of the fingers seems to involve a distortion of a fundamentally good idea. Writers' cramp may be avoided and evenness of line achieved by making the larger and stronger arm muscles do the work of propelling the pen through space. But while larger motions are the original ones that the child uses, eventually he does employ the more refined manipulations made possible by the use of the end joints; there is consequently little reason for "freezing" his manual-motor development on an earlier level. Individual variations in "style" are just as inevitable here as they are in other muscular co-ordinations. Second, the frequent use of

ovals or "bedsprings" as writing exercises and "fence pickets" to limber up the writing musculature is an empty type of drill whose contributions to calligraphy are dubious at best. Third, actual comparison of the normal handwriting of two large groups of adult teachers, one of whom was taught the Palmer method as children, and the other a combination of systems or no system at all, showed no difference in speed or quality of penmanship — if anything, the non-Palmer group was slightly better on both counts! If the method fails to "stick" and if there is a relapse in most learners to other methods of writing than those advocated by this technique, this is some indication that it may not be the most suitable procedure. A strong desire to write well, a little self-study of the most convenient posture, and attention to suitable models and materials will probably achieve all that the best graded manual of exercises can produce.

## THE LEARNING OF ARITHMETIC

The subject matter of elementary arithmetic consists of the four fundamental operations — addition, subtraction, multiplication, and division — performed with whole numbers, fractions, and decimals, and applied to such simple concrete situations as "A farmer had $10,000 to divide among his four sons; how much did each receive?" A psychological description of arithmetic, however, is forced to emphasize its symbolic nature in which numbers and their relations are substituted for extended masses or quantities for ease of computation; the results of its operations can always be verified by checking them against the concrete materials to which they refer. The universal statement that "$5 + 4 = 9$" can be illustrated by grouping together 5 apples and 4 apples to make 9 apples; but to appreciate that any other objects would do equally well is the essence of the arithmetical insight. The language in which this numerical relation is stated is similarly indifferent, *i.e.*, "*fünf*," "*vier*," and "*neun*" could all be used in place of "five," "four," and "nine" (or vice versa) without altering the basic connection of these quantities to each other. Because arithmetic is a language common, or potentially common, to all

human minds, the abstract character of its conceptions is its chief asset and mark of distinction.

The growth of the number concept in the infant is far from being well understood even by specialists. Some features of it apparently exist in nonhuman creatures. Higher animals which have more than one offspring born at one time definitely notice the absence of some members from the full litter. It is highly likely that the first human roots of arithmetical understanding lie in some similar perception of "manyness" as distinct from "oneness" or "fewness." Further differentiation makes it possible to tell at a glance a "trio" from a "quintette": the degree of "muchness" is greater in the latter than in the former. This span of perception for discrete objects can take in accurately about six or seven items at a single glance, but beyond that a sharp falling off in precision occurs. Counting develops as soon as serial distinctions of place and order can be made.

**"Differentiation" as an arithmetical process.** The organismic position stresses these simple observations and disposes its adherents to argue for the priority of division in instruction instead of beginning with the additive process. Thus, it is held that an appreciation that $4 = 2 + 2$ is a better approach than to begin with $2 + 2 = 4$. This "breakdown" method preserves better the original connections of the pieces, an advantage of considerable pedagogical importance. For example, to take a circle ○ as a relatively undifferentiated unit and to bisect it ⏀ means that an "automatic" or spontaneous relation between the distinguishable halves is produced by the act of division. This inherent relativism of mathematical facts is also apparent in the converse situation where two drops of mercury fuse, thereby losing their "duality" in the new unitary whole thus created. That primitive thinking — which is not necessarily inexact or inadequate thinking — operates in this fashion is suggested by the Zuñi name for "three" which is derived from the midfinger meaning "the partner which divides equally." The origin of the decimal system of counting in the fingers or toes is too obvious to be disputed. At a more advanced level, the analogy between the 360° assigned to a circle and

the number of days in a Babylonian year makes it clear that number is relativistic in nature and a sharply defined instance of the part-whole organization of things.

The principal intellectual task of the child so far as arithmetic is concerned is to discern the systemic nature of the number series. That every number when multiplied by 5 gives a product ending either in 0 or 5; that any number multiplied by 9 produces an amount the separate digits of which can all be added or reduced to 9; — these and many other numerical curiosa are "lawful" and necessary consequences of the method of organizing by tens. The structural aspect of arithmetic appears whenever one feels that the "inner movement" from 6 to 6,000 is distinctly greater than the mixed visuokinesthetic impression one has in passing from 6 to 60. A related objective of such number work is to establish a picture of the number system that may look approximately like that shown in Figure 52. The "prongs"

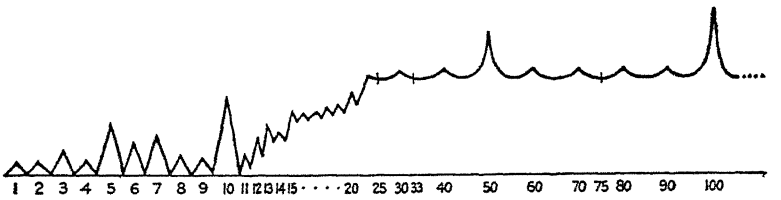



FIGURE 52

at various intervals like three, five, and the multiples of ten indicate that these points are normally subjectively emphasized in one's imagery. This arrangement need not be standard or alike for all learners, but it does seem important that something like it be present if numerical competence is to result. With different mental sets the structure may show peaks and valleys at slightly different points, *e.g.*, a table of squares and roots would intensify the points, 36, 49, 64, etc.

**Paradoxical "individuality" of general concepts.** The greater the individuality of numbers, the easier it is to perform operations with them and the clearer and more prominent they are to the learner. The differential frequency with which errors appear for certain num-

ber combinations is a measure of their difficulty, but difficulty in turn is allied to the lack of perceptual clarity. Thus, $5 + 5 = 10$ is an "easy" pattern, but $7 + 9 = 16$ is distinctly "harder"; apparently the pupil can locate the scalar jumps more precisely in the first case than in the second, *i.e.*, he answers in the approximate "area," but not at the exact "point." The elimination of mistakes due to low comprehension depends upon increasing the fineness of internal differentiation within the number structure itself.

The arithmetical intentions of the elementary school are fulfilled when the pupil finally becomes as acquainted with numbers as a historian is with calendar dates. Case studies of "lightning calculators" indicate that they do achieve this sort of intimate acquaintance with each number. Just as 1859 means such things as the publication of Darwin's *Origin of the Species*, the death of Schopenhauer, the birth of Wilhelm II and John Dewey, John Brown's raid on Harper's Ferry, and much more, so any number like 48 is viewed not absolutistically by itself but as "one more than 47," "one less than 49," "the sum of $40 + 8$," "the product of $16 \times 3$," "a number 4 times greater than 12," and a variety of other relationships. Every number is then seen as the nodal point or nexus of a good many interconnecting strands which criss-cross back and forth throughout the structure of the number system itself.

This individuality of the separate numbers rests upon their psychological properties as well as upon their strictly mathematical attributes. A simple demonstration will show that the two-place numbers differ notably in the ease with which they can be learned or remembered. Divide the first 100 numbers by chance into four series of 25 each. Read each of them aloud once to as large a group of listeners as can be found. Have each subject write immediately on prepared cards all the members he can recall after each list has been read, disregarding the original order of presentation. An inspection of the cards will soon show that some numbers are frequently omitted and distorted and that others are correctly reproduced with exceptional frequency. For example, 21 is an "easy" number to hear once and to

recall, but "26" is one of the hardest of the lot. This can be verified by making percentage calculations for each number from 1 to 99; if, for instance, 27 appears in one of the aural series and is noticed by 4 out of 10 listeners, its frequency of correct response is 40 per cent. In a study by the writer on a group of 234 subjects, the following results were obtained by this method:

To answer the general question whether any one two-place number is easier to learn or remember than another, required allotting by chance the first hundred numbers to four series of 25 each. Each series was preceded and followed by three numbers designed to neutralize primacy and recency effects.

Each series was read by the experimenter to psychology classes, totalling 234 students, who were instructed to write immediately on prepared cards all the numbers they could recall, disregarding the original order of presentation. Half the students heard the series in the order, I, II, III, IV; practice effects (though slight) were equalized by giving the other half the series in this order: IV, III, II, I.

If 27 appeared in a presentation and was noticed by 41 out of 100 subjects, its frequency of correct response was 41 per cent. A percentage record was computed for every number from 1 to 99.

Application of the Spearman-Brown reliability formula yielded a self-correlation of 0.81.

*Results.* (1) The average recall value of all 99 numbers is approximately 38 per cent.

(2) The recall value of the numbers 1 to 9 is very high, the average frequency of correct response being 71 per cent. This is probably attributable to the contrast afforded by these simple digits in a body of two-place numbers. The other average values by tens are: Numbers 10–19, 51 per cent; 20–29, 36 per cent; 60–69, 33 per cent; 70–79, 27 per cent; 80–89, 32 per cent; 90–99, 39 per cent.

(3) Double numbers, such as 22, 33, etc., are apparently easy to recall, the average correct response being 44 per cent.

(4) Contrary to expectation, numbers whose digits are in natural sequence (*e.g.*, 23, 34 . . . 89) give an average recall value of 33 per cent, somewhat lower than the general average.

(5) Numbers ending in 5 have an average value of 34 per cent; numbers ending in 0, one of 36 per cent; both are slightly inferior to the general average.

(6) The order of numbers, from easiest to most difficult, is as follows: 1, 2, 5, 4, 9, 3, 8, 11, 61, 6, 10, 12, 19, 21, 16, 50, 7, 99, 22, 17, 23, 98, 33, 88, 13, 14, 90, 18, 56, 87, 97, 77, 96, 27, 55, 65, 79, 31, 91, 35, 36, 64, 66, 80, 15, 45, 86, 39, 44, 25, 37, 40, 54, 81, 20, 42, 47, 63, 32, 94, 38, 70, 72, 57, 73, 92, 95, 30, 49, 78, 85, 93, 41, 60, 62, 67, 76, 29, 55, 34, 46, 59, 84, 89, 24, 82, 26, 28, 48, 51, 53, 69, 52, 83, 43, 58, 71, 74, 68.[1]

The foregoing facts are, in a sense, of more practical importance to a telephone operator or a football team learning signals than they are to an elementary-school teacher. Nevertheless they reveal certain behavioral peculiarities about numbers as they enter the life of a young pupil, and make possible a " personalization " of what would otherwise be a very abstract type of experience.

## THE IMPROVEMENT OF LANGUAGE USAGE

Oral and written speech are the chief media of communication between the various members of the human family. The core of the problem of developing competence in this area is the creation of that which teachers of English have long called " sentence sense." Disjointed words and phrases do make possible some sort of intercommunication, but the user is relatively inarticulate and his listener is far too likely to gather a different meaning from that which was intended. The sentence comes nearer to conveying a complete and self-contained unit of thought than any other language pattern, whether larger or smaller.

There is an extraordinary unanimity of agreement to the effect that instruction in formal grammar is not the most satisfactory way of producing a good command of either the spoken or written tongue. Apparently it is far better to provide the child with something to say

[1] George W. Hartmann, Determination of Easy and Difficult Number Combinations by Immediate Auditory Memory, *Proceedings and Papers*, Ninth International Congress of Psychology, pp. 210–211. Published by Psychological Review Company, Princeton, New Jersey, 1930. The methodological difficulties of primacy and recency which may occur to the critical reader were " neutralized " by having three nonduplicate numbers precede and follow each series; these were later disregarded in the tabulation wherever they appeared in the responses.

and to encourage him to say it at the risk of many errors than to encumber him with a body of hard-to-understand and hard-to-apply rules of syntax before he begins to express himself. Psychologically all forms of speech are ways of reducing tension in the speaker (or writer), but unless some tension is present, there is no motive for utterance. Hence, it appears that the most prolific and possibly also the best users of language are those who have the most and strongest tensions to release; the voice or pen are the specialized outlets that are used by preference because their energies flow most freely through these channels.

In the development of language habits, the question of word order is one of the first problems of symbolic synthesis that the pupil must solve. Basically the issue is little different from that of the order of movements in learning to swim except that speech seems to afford more variety and plasticity of equally good alternatives and that the preparation of each new sentence is a fresh problem for independent solution every time a need for such response is felt. Inflection as a language technique solves the same problem that a rigid word order does but by a different scheme. Commenting on this, Kantor says:

> An analytic language, even moderately analytic English, makes greater use of word order than a highly inflected one. *John loves Jane* constitutes a form of reference altogether different from *Jane loves John*. Word order in Latin is less formalized, so that the Latin equivalent of *Julius loves Julia* may be variously arranged as follows:
> *Julius amat Juliam, Julius Juliam amat, Juliam Julius amat, Amat Julius Juliam, Juliam amat Julius, Amat Juliam Julius.*[1]

Another basic adjustment that the learner must make is to the changing meanings of words themselves. This is the important field of semantics which affects human relations in more subtle ways than is commonly appreciated. A pupil may first learn that "temple" is the name for a "sacred dwelling" and later discover that it also means the "side of the forehead." This, however, is a less serious cause of

[1] J. R. Kantor, *An Objective Psychology of Grammar*, Bloomington, Ind., Indiana University Publications, No. 1, 1936, p. 92.

confusion than the fact he may call a certain action "good" while his teacher or parent label it "bad." He has little trouble with simple concrete expressions such as "The yellow pencil is on the table" but falls into all sorts of ambiguities with items like this: "The Founding Fathers loved *liberty* and *freedom* above all else." The more general the conception the more likely it is to have different "referents" or specific denotations for the different persons who use it. That is why improvement in thinking and improvement in language so commonly go hand in hand with the former as the more fundamental causal factor.

Both the oral speech and written composition of individuals are reflections of the kind of personality that is behind them. Clear and distinct enunciation is usually a sign of a healthy, confident, and "open" nature; per contra, poor speech habits, where they are not due to organic voice defects or cultural limitations, often betray the emotional insecurities that lie behind them. For this reason, instruction cannot content itself solely with the treatment of specific symptoms but must concentrate upon freeing the learner from the inhibitions that weigh upon him. An extremely shy child cannot speak effectively because of the inner brakes which restrain the use of his end organs. Similarly in writing, a perfectionist standard or undue fear of the reader's reactions to one's performances may depress the quantity and quality of expression. Stage fright is an acute form of this type of difficulty to be overcome best by strengthening the learner's general social adaptations to others and by objectifying his own attitudes toward himself.

This is not the place to develop the intricate questions of speech pathology involved in stuttering and stammering, but reference should be made to the view that these phenomena may be chronic emotional disturbances released by any group situation. Most stutterers cease to be such when they talk to themselves; the presence of another person is the crucial cause of the difficulty. Speech is a *social* function and not just a physiological reaction. Optimistic educators and psychologists hold that an understanding of his own growth and personality will free the individual psychologically from his environment just

as thoroughly as the airplane has freed the physiological " self " from the physical environment. If so, self-knowledge or insight into one's own nature must be promoted by the school as the truly " royal road " to the surmounting of all personality difficulties and the attainment of all educational aims.

## SUMMARY

The American elementary school has long ago broken the bounds of the 3 R's curriculum, but amidst all the useful " extras " that have been introduced in recent years the language arts continue to maintain their supremacy. In the chapter just ended we have consequently been concerned largely with sampling the modes of psychological thinking that one encounters in this area. Reading difficulties are encountered well into college years, but it is in the early grades that speed and comprehension levels first become significant signs of the child's general intellectual progress. Reading is a far more elaborate mental process than many adults are disposed to believe, yet in essence it is the perception of " total " symbolic patterns as even the curious reversals like " saw " for " was " amply suggest. Whereas reading is primarily a sensoricentral performance, handwriting is chiefly a motor act. Children can learn to write by many different methods, yet in all cases the economical and esthetic reproduction of certain standard and characteristic forms is the heart of the skill. Arithmetical symbolism is a more condensed form of ordinary language, *i.e.*, " 500 " is a more compact rendition of a point in a number series than " five hundred." The child's task here is to perceive the number system as a fixed scheme of linear quantitative relations. The deeper arithmetical computations are buried in strange or " unreal " problem situations, the more difficult the pupil finds them; hence reasoning maturity and solving capacity are best furthered by centering the arithmetic about issues that fall within his normal experience. Man is a symbol-creating and symbol-using animal, a feature of his behavior which recurs most frequently in his oral and written language, his chief means of communication. The structure of oral discourse is looser than that of written composition and grammatical " errors " are more numer-

ous, but in both cases the primary task of the speaker or writer is the verbal expression of some unit of thought that needs to come "out."

The elementary school child also exhibits interesting psychological phenomena in connection with his development in the arts and crafts, the sciences, the social studies, foreign languages (where these enter his life), and in the area of bodily and social control. These have been touched upon in the various "improvement" chapters of Part II, or, because of their overlap with later phases of growth may be considered in connection with the secondary subjects to which we now turn.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Why does the problem of "method" loom so large in any applied science? Is educational methodology equivalent to the strategy and tactics of personality development?
2. Illustrate how the concept of "readiness" appears to be needed in explaining the age and time factor in teaching other skills than reading. Is there such a thing as chemistry readiness? How would you ascertain it?
3. Are the arithmetic *errors* of children in any respect different from those of adults? Are the *operations* or *problems* which they find easy or difficult the same as those so experienced by adults? Secure the answers to these questions by studying the responses of a half dozen elementary-school pupils and an equal number of unselected grown-ups to the same arithmetic test. What significance do you see in your findings and in the general problem here involved?
4. What have been the apparent effects upon children's language processes of early instruction in the use of a typewriter? Consult the technical literature on this point before responding. What "mechanisms" account for the effects observed?
5. How do you account for the relative superiority of gifted elementary children's poetry to their prose productions? Or does this question rest upon a misapprehension of the true state of affairs?
6. Is a curriculum with sharply segregated subjects or one that is centered about the child's current interests and activities more in harmony with the general psychological position put forth in this text? Why?

# Chapter 15

## PSYCHOLOGY OF THE HIGH-SCHOOL SUBJECTS

The basic psychological fact about secondary education is that it covers the years of puberty and adolescence. During the junior-high-school period this feature is ordinarily more obtrusive than it is in the senior-high-school age. The passage from childhood into youth usually involves no clear break with the past at any point, but occasionally rapid reorganizations of purposive conduct with distinct changes in emphasis — *i.e.*, " conversions " of either a religious, political, artistic, or occupational content — give some support to the " saltatory " theory of development as this is contrasted with the " continuous " notion [1] of easy and gradual progress. More important to the present context is the expansion of ideas, interests, and activities during the secondary-school years through the mediation of the many subjects which crowd even the leanest school program. The separate " courses " in this and that mean that the differentiation of knowledge has now reached a point in the pupil's life where choices among competing values must be constantly made to avoid being overwhelmed by the wealth of material in his environment of which he is now more keenly aware than hitherto.

### THE SOCIAL STUDIES

Just as the language arts are the most representative " academic " content of the elementary school, so the various social sciences —

[1] It will be noted that this is a special case of the debate between the " ramp " and the " staircase " or " elevator " theories of learning, the former being more congenial to the connectionist outlook and the latter to those views in which insight is stressed. Obviously ascent may take place by either method!

history, geography, civics, economics, sociology, or the more composite special-purpose courses like " problems of democracy " and " citizenship training " — appear at present to represent the core of the secondary pupil's schedule. Similarly, the evolution of a " sentence sense " in linguistic matters is as fundamental there as the development of a " time sense " in historical affairs. The chronological framework that a history student constructs for himself conditions his ability to " find his way around " in this area as much as an appreciation of the structure of the number system affects his arithmetical skill. Geography is an allied discipline of necessity because its chief concern is an improvement of the spatial orientation of the pupil. The fundamental nature of both history and geography considered jointly appears as soon as one recognizes that all events are located in time and in space, the factors which give these two school subjects their distinguishing quality. The rest of the social sciences deal with the institutions man has created and tend to center about the dynamics of group living.

Geometrically, it is both interesting and significant that the child matures much sooner where purely spatial orientation is concerned than he does in his perception of time. A 4-year-old rarely gets lost in his own neighborhood even though he may not know the location of Afghanistan or the name of its capital city. However, it takes him until he is 7 or 8 before he can tell time correctly by the clock. " Position " habits are so easily learned by animals that experimenters must take constant precautions to eliminate them when the " point " of the experiment lies in some other form of behavior. Temporal sensitivity, other than that dictated by gross organic rhythms, seems to be relatively feebler. This difference is maintained by young humans until they have learned to reduce the original gap by instrumental aids, but even then the space-and-time frame of reference of the average adult leaves much to be desired in terms of completeness and detail.[1]

[1] Karl Buehler's recent researches have shown that all animals, including man, are partially oriented by (1) gross directional factors, called by him the *compass*

The map is the heart of geography instruction — not, however, the customary political map with national boundaries alone emphasized, but the physical, population, and resources maps. A map is a miniature configuration conforming in essentials to some larger reality, but always omitting or distorting some phases of it. The familiar Mercator projection of the earth's surface seems to be the commonest visual image that most educated adults have of the earth's surface — a somewhat disastrous result considering the spheroid shape of our globe. Flat maps exaggerate the size of the land and water areas near the poles and therefore relatively minimize those near the equator, but each of the many special "projections" developed by geographers have peculiar advantages and disadvantages to the "observer." Certain false impressions may also be conveyed by the custom of showing the United States, North America, and the "New" World generally at the left, *i.e.*, the less preferred, side of a flat map. This is because the first map makers were Europeans with a reference center traceable to this cultural fact. Obviously, it would be as justifiable to place the United States in the center of a flat map or at the "right," although our nationalist sentiment is probably sufficiently intense without stimulating it further by this procedure.[1]

**Temporal order in history instruction.** If geography is largely a map-centered science, history by implication is focused about dates —

---

principle, and by (2) finer cues, which he terms the *pilot* principle. Similarly, temporal orientation is achieved by one of these three methods: (*a*) an inner clock; (*b*) the cosmic clock, *i.e.*, day and night alternation and the rhythm of the seasons; and (*c*) actual timepieces and calendars. The "inner clock" is regulated by the metabolic cycles, for ants who were usually fed at a fixed time would arrive at the feeding spot earlier if given thyroxin (which speeds up bodily oxidation) or later if quinine were administered (this slows down the burning of tissue). — In many psychoses, mental deterioration is first manifested by a pronounced absence of even approximately accurate space-time orientation.

[1] It may not be amiss to state here that the ordinary highway maps distributed without charge at most gasoline stations put to shame most of the expensive maps used in our schools. Clarity, legibility of type, beauty of coloring, and topographical indicators are much superior. Until wall charts match them in comprehensiveness, teachers would be well advised to substitute road maps for most other flat maps on strictly pedagogical grounds alone.

not dates in the narrow pedantic sense as points marking time sequences in cultural changes. If everything that occurred before this moment is assigned to the past and history defined as the study of man's past achievement, then obviously almost all of human knowledge is properly subsumed under "history." History, however, is not one thing but many; it would be far more correct to speak of "histories." A history of art is different from a history of science in content, and a military history while related to the history of education is not identical with it. Instead of a course in history per se (which usually means political history), there is psychologically better reason for introducing relevant history into every school subject, such as an outline of the history of biological thought in a class in zoology or selected phases of mathematical history in either algebra or geometry. In any such special discipline, some attention must be given to the establishment of a time scale if solely for the sake of perspective, although the gains in interest also justify this procedure. The growth and evolution of existing things, the study of origins, and the backward projection of present institutions into the past or the forward projection of older cultural practices into the present — all these when mastered provide the pupil with a mental structure and temporal pattern which enable him to feel at home in an otherwise strange and incomprehensible world. A good plan for furthering this outcome is to establish a "time line" and then under a specific date, say 1840, list all the important personages, events, and creations under such heads as government and law, military and naval affairs, travel and exploration, philosophy and religion, science and medicine, literature, music, painting and sculpture, education and scholarship, industry, commerce, economics, finance, technical inventions, labor, and whatever other captions one wants to remove from the "miscellaneous" column. Such a scheme permits desirable cross references to contemporaries and conveys as organic a picture of the activities of former societies as can be achieved without a sound-film documentation of the period.

Extremely suggestive of the untapped possibilities in this field is

the novel experiment in teaching history backward reported by C. C. Crawford and W. L. Walker.[1] The usual custom of carrying historical analyses forward rather than tracing the present to its origins regressively was shown to be somewhat less effective than the new plan which they introduced. The "backward" procedure has certain obvious psychological advantages: It explains the past more clearly because it compares it with what the student already knows and understands in the present; to begin with the unknown and to move forward to the known seems less satisfactory a way of growing mentally than to reverse the process.

*Table XIV. Results of the Experiments Comparing the Forward and Backward Methods of Teaching History*

| | Immediate | | Retention | |
|---|---|---|---|---|
| | Forward | Backward | Forward | Backward |
| Average Class I..... | 34.97 | 38.18 | 35.66 | 36.49 |
| Average Class II..... | 31.41 | 35.53 | 34.38 | 36.56 |
| Total... . . . . | 66.38 | 73.71 | 70.04 | 73.05 |
| Difference favoring backward method..... .... | 7.33 | | 3.01 | |
| Chances that the difference is real..... | 480,000 to 1 | | 62 to 1 | |

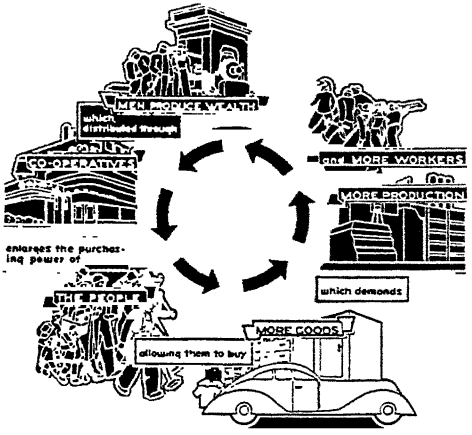
**Blending of "facts," "values," and "acts" in course work.** In the integrated courses in "general social science" offered by many high schools, the chief classroom problem is that of maintaining a scientific attitude and a tolerant, humane spirit in connection with the numerous controversial issues that characterize this area. The disciplines of economics, government, sociology, etc., are not lacking in facts — on the contrary, they are extraordinarily rich in them — but sheer description alone does not satisfy the needs of the learner. To the pupil the information derived from these areas is vital to the development of his personal social philosophy even if this remains of a

[1] C. C. Crawford and W. L. Walker, An Experiment in Teaching History Backward, *The Historical Outlook*, 1931, 12, 395–397.




FIGURES 53–56. Social studies charts on various major topics, illustrating the

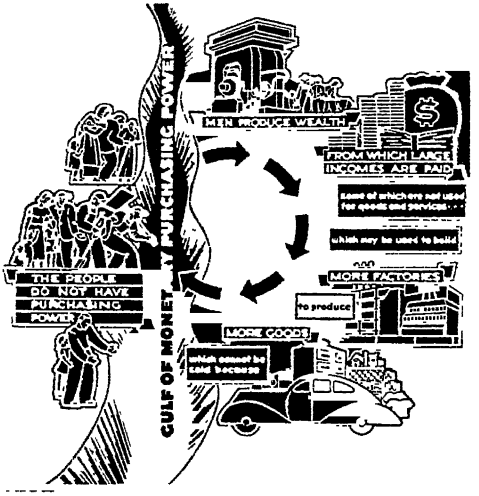
**tendencies under cooperation**
(a point of view)




*To what extent is this analysis sound?*

*Arranged by* THE NATIONAL FORUM

**tendencies under private enterprise**
(a point of view)




*To what extent is this analysis sound?*

*Arranged by* THE NATIONAL FORUM

possibilities of education for eventual "action" as well as for sheer "knowing."

crude and unformulated type. Elementary economics can be, and unhappily has been, presented in such a fashion that pupils come to view it as a "dismal science" (Carlyle) rather than as a body of knowledge of exceptional significance for the welfare of themselves and their associates.

Instruction in this and allied fields must appeal not only to the heads but also to the hearts of the learners. Pupils need to study the facts about societal institutions not solely in order to know how the Sherman antitrust law came about, where the Tennessee Valley Authority operates, and why alien immigration has been sharply restricted in recent years, but also to equip themselves with an enlightened passion for a new and better social order. The senior high school through its social-studies program is in a key position to develop an interest in community improvement, to consider all proposals for social change fairly, to study the ways and means of removing the many obstacles, physical and psychological, that stand in the way of regional betterment. All pupils are potentially sensitive to the appeal of extending political, social, and economic democracy, whereas only a few are much concerned with the mechanics of supply and demand for elastic commodities. American history taught solely as a succession of presidential administrations can be as deadly as the sequence of the Avignonese popes, but viewed as the saga of the rise of the "common man," it can be one of the most exciting of educational adventures. Methodologically, the effort to carry on instruction in the social-science areas through the unification provided by "the improvement theme" is as helpful to the learner *and* to the objective situation as "the efficiency motif" has been in the domain of engineering. Indeed, the two situations are essentially alike, despite the differences in the materials that are to be manipulated.

## THE NATURAL SCIENCES

Introducing a child to the world of science is a process that requires the isolation of key phenomena so that he can react to them as clear figures upon a less clear ground. Ordinarily the specific events

of nature in which the scientist is interested are entangled in a larger matrix of occurrences or objects which are considered irrelevant to the primary item of attention unless shown to be otherwise. The first task of instruction in these areas is not to amplify the general question, "What is science?" but to have the learner perceive as best he can what is happening when strips of zinc dropped into a bath of hydrochloric acid cause the liquid to "boil," when a tap slightly below the kneecap on a loosely dangled leg causes the limb to kick forward, when a doorbell wired to a charged battery rings, etc. These are relatively simple, easily observed concrete occurrences, representative of the type situations out of which scientific reflection historically grew.

The advantages of acquainting the pupil with the scientific mode of thought through the orientation or integrated courses known as "general science" are traceable to the unity of approach which this permits. A great variety of natural events can be considered without first wondering whether each should be thought of as a physical problem, a question in chemistry, an issue in biology, or any other distinct field of specialization. To learn that an eclipse of the sun is always caused by the passage of the moon between the earth and the sun is to have grappled successfully with an impressive happening; whether this "problem" or event is to be considered an astronomical, geographical, geological, meteorological, or even religious issue, is, from the standpoint of educational psychology, distinctly secondary and of minor importance. What counts in scientific activity is the problem as problem, and not the accuracy of the assignment of specific topics to certain established areas of scholarship. Much harm has been done even among adult scientists by the development of a narrow viewpoint concerning the dominion of science, so that an analysis of the structure of pulpwood is considered to be necessarily "scientific," often without much inquiry as to the kind of analysis that is made, while a study of the difficulties of learners with such concepts as "energy" and "motion" is deemed in advance to be "unscientific" because it is categorized under the head of pedagogy. If the

pupil is early brought to grapple with many different concrete problems under the heading of "general science," such unwholesome restrictions upon the issues that lend themselves to scientific treatment are minimized.

**When is one scientifically minded?** There are good reasons for believing that the heart of the human activity called science does not lie in a familiarity with theories and experimental results and a mastery of laboratory or apparatus techniques (although these are important ingredients), but in a less tangible psychological acquisition called the "scientific attitude." According to Noll, this entity consists of six fundamental habits of thinking:

1. Habit of accuracy in all operations, including calculation, observation, and report.
2. Habit of intellectual honesty.
3. Habit of open-mindedness.
4. Habit of suspended judgment.
5. Habit of looking for true cause-and-effect relationships.
6. Habit of criticism, including self-criticism.[1]

This list is probably not complete and is subject to different interpretations of what (3) and (4) concretely imply in specific cases. On the other hand, this statement of characteristics is important because it is readily applied to matters that fall outside of the fields conventionally termed "scientific." Thus, Noll's test of this function consists in applying it to such assertions as:

A college student who chooses his profession without consulting anyone will probably fail.

We won the World War because our side was right.

An only child is a spoiled child.

The judgment of truth, falsity, or "uncertainty" of such statements and the evidence brought to bear in support of any one of three possibilities give both teacher and pupil an excellent opportunity to develop the larger significance of the scientific approach in all human affairs. This personal and social function of scientific activity is prob-

[1] Victor H. Noll, *The Habit of Scientific Thinking*, New York, Teachers College, Columbia University, 1935, p. 4.

ably more useful to most high-school students than a knowledge of the valence of calcium or the number of varieties of the lily to which some science courses deliberately confine themselves.

**One way of solving the question of topical sequence.** A major problem in all the well-organized special sciences is to know the best order of presentation of its leading principles. In physics, for instance, should the facts about chromatic aberration be taught before the phenomenon of evaporation is explained? Such issues are "live" teaching problems because the insights demanded in connection with different content are of varying levels of difficulty, and it is axiomatic that ideally efficient learning would not place a harder task before an easier one if the pupil's intellectual development is to be properly "paced." In arithmetic, it is fairly clear that a *minimum* mental age of about 11 years is required for successful instruction in decimals, and that an optimum mental age of about 12½ is suitable for the learning of long division. Similar maturity conditions unquestionably exist in all subjects, even though many of them have not been defined in detail, and their utility is not always clear to those who trust to a rough empiricism to indicate what can be successfully taught at any given age or experience plane and what must be postponed or omitted. In all such cases it is well to remember that knowledge can be organized after many different patterns and that the psychologically best designs or sequences are those which suit the learner's private purposes and which aid groups to achieve their collective ends.

The relative difficulty of each principle, concept, or generalization in any science is best determined by the ease with which it is applied to special instances of the "law." Thus, a pupil's command of the statement, "When a body is heated, the average speed of molecular agitation increases," can be tested by the nature of his answers to such allied-type questions as these:

1. Why does a body expand when heated?
2. Why does hot water evaporate more rapidly than cold?
3. Why do metals become hot when pounded?
4. What is the relation between temperature and the molecular theory?

5. Why are gases, having fast moving molecules, poorer conductors of heat than metals?

The normal percentages of acceptable and unacceptable responses can be computed for the hundreds of distinct principles contained in the corpus of the secondary-school sciences. One junior class in physics yielded results of the kind now to be described. Among the very easy insights in this area are these items:

Unlike poles of magnets attract each other; like poles repel each other.

A magnet has two poles, connected by magnetic lines of force.

All matter is made up of protons and electrons.

Energy can never be created or destroyed; it can only be changed from one form to another with exact equivalence.

Freezing and melting temperatures of liquids are the same.

Light travels in straight lines in a medium of uniform optical density.

Musical sounds are distinguished from noises in that they have a definite pitch and are pleasing to the ear.

These should be contrasted with some sample principles at the other end of the difficulty scale, where the insight is completed only after overcoming exceptionally severe resistance:

The time of vibration of a pendulum does not depend upon the nature or weight of the bob, or on the length of the swing, but does vary directly as the square root of the length and inversely as the square root of the acceleration of gravity.

Heat is conducted by the transfer of kinetic energy from molecule to molecule.

Spherical aberration is caused by the failure of the marginal rays, passing through a lens, to pass through the principal focus.

When energy is transmitted in waves, the medium which transmits the wave motion does not move along with the wave, but the energy does.

Molecules lose electrons when struck by high-speed electrons or ions.

Critical inspection of these two types of scientific propositions — the one easy and the other hard — shows that the difference can be

attributed to such factors as these: Simplicity of the basic idea, vocabulary complications, variations in the amount of direct perceptual experience with the underlying phenomena plus attendant obstacles to sensory "imaging," and intricacy of the mathematical relations implied in the statements. Of these, the last two features are probably more decisive than the first two in acting as barriers to smooth assimilation. Support for this interpretation may be gathered by an examination of a few items of "intermediate" difficulty:

The volume of a gas varies inversely as the pressure to which it is subjected, other things being constant.

The boiling of any liquid will take place at that temperature at which the pressure of the saturated vapor is equal to the pressure on the surface of the liquid.

Refraction is caused by the change in speed of light as it leaves one medium and enters another.

Two sound waves of the same or nearly the same frequency will destructively interfere with each other when the condensations of the one coincide with the rarefactions of the other.

When a current flows through a conductor, magnetic lines are induced around the conductor, their direction depending upon the direction of the current.

That scientific concepts are "hard" roughly in proportion to their literal intangibility makes it all the more important that pupils have every possible opportunity to see, hear, feel, taste, and smell the natural events to which they refer. In general, the insights covered by the categories of introductory physical science are achieved in this order: Heat, mechanics, light, sound, and electricity. It seems reasonable to believe that the comparative impalpability of sound, and particularly electrical, phenomena accounts for this arrangement; perhaps, too, the failure of our culture so far to make fuller use of the notion of "field forces" which seems to underlie all our understanding of nature is responsible for the relative ineptness in dealing with certain abstractions pertaining to reciprocal dependencies.[1]

[1] For a fuller discussion of this theme as applied to a single course, see G. W. Hartmann and Dean T. Stephens, The Optimal Teaching Sequence for Elementary Physical Principles Based on a Composite Scale of Pleasure-value and Difficulty of Insight, *Journal of Educational Psychology*, 1937, 28, 414–436.

## THE FOREIGN LANGUAGES

There was a time when the secondary-school curriculum was more loaded with such ancient tongues as Greek and Latin and the modern European languages, notably French and German, than is now the case. The decline in their relative importance is attributable to a mixture of causes, but the changing social values of pupils and teachers and the justifiable suspicion of a strongly linguistic or verbal kind of education appear to have been most influential. Nevertheless, in a world in which international contacts seriously affect human welfare, the study of languages and literatures other than those of one's own country is not likely to disappear, and the special psychological problems connected with their use are certain to be found until mankind adopts a uniform speech and the existing languages are "dead."

From the organismic standpoint, any form of language instruction is necessarily lowered in effectiveness whenever it occurs outside the cultural setting in which that language is normally employed. To learn to speak and write Italian outside of Italy (or those communities in which it is the ordinary medium of discourse) is almost as bad as trying to swim on dry land. The absence of the natural context for most foreign-language study is a severe handicap and is functionally equal to deprivation of certain major senses or to a lowering of one's normal level of brightness. The American traveler who sees a sign marked "École" or "Pont" as his car approaches these structures in Québec is engaged in word learning by the "direct" method under circumstances where interest, motivation, and other factors conducive to rapid acquisition are favorable. Similarly, his reaction to "Escuela" and "Curva" on Mexican roads (especially if the latter word appears in conjunction with the universal symbol ↰) is ordinarily more "lifelike" than if these terms first occur in an English-speaking classroom far from their native "habitat."

This outlook, of course, is of little practical service to the instructor and pupil who must grapple with matters of language expression without the support provided by the labels attached to material cul-

ture objects in their original environment. The next best thing to learning German in Germany is to make the course in elementary German not just a course of exercises in the language per se, but an introduction to German culture and civilization as a whole. A needless pettiness has characterized too much translation of the type, " Der Hund hat zwei Augen "; what is really needed is some geographical, historical, literary, artistic, and scientific material concerning the German people as a national group to serve as a background for the language practice; the linguistic patterns in turn may then be used to convey further knowledge about the aspects of the total culture that is being studied or even about material of universal or non-national scope.

The curse of all language study has been a tendency to keep the learner lingering over grammatical details and postponing until fairly late in the day all contact with the real substance of creative thought that is embodied in the foreign tongue. A much sounder plan is to offer the beginner a graded anthology dealing with many varieties of style and content, perhaps even beginning the instruction by parallel pages of original and translation. This " reading " method preserves the " wholeness " of thought that adds so much to both meaning and interest, and prevents language study from degenerating into a mechanical form of word substitution. The ability to think, write, or say " maison " in place of " house " (and vice versa) is a minor accomplishment which a frequency count of words or idioms can readily produce for the thousand commonest expressions; far more important is the achievement of that *Sprachgefühl* (= sense of the peculiar structure of a language) as it manifests itself in the formation of an independent sentence. This is an " emergent " or complex pattern reaction which appears after the contact with the written and oral language has created a comprehension of the special configuration characteristic of every tongue. It is an insight based upon a blend of sensory and motor components. For this reason, authentic " classical " models of the best and/or the most representative passages in the language, *i.e.*, the most Spanish paragraphs in all Spanish letters, need

to be analyzed until the peculiar distinctiveness of its verbal pattern is clearly grasped. Then, and only then, can one correctly claim that the language has been learned.

## PSYCHOLOGIZING THE ENTIRE CURRICULUM

The type of discussion developed in the foregoing for three large areas of secondary-school activity could profitably be extended to include such fields as the commercial subjects, industrial and vocational education, home economics, health and physical education, music and the fine arts, religious, moral, and character education, etc. Each of these topics is rich in psychological applications. Many of these behavior issues are highly specialized, notably in the psychology of music where, for example, the problem of the improvability of pitch discrimination has lately been solved in much the same terms as the more general and acute question of the modifiability of an individual's IQ; other issues are much less intricate technically as, for instance, the discovery that school pupils do change their personal food selections at cafeteria luncheons in accordance with the general nutritional implications of a simple course in dietetics, indicative of a genuine transfer from the classroom situation to other scenes.

There is, however, a general point of view which should be presented here because it affects all the usual high-school subjects in much the same way. What experiences should be emphasized during the secondary-school years and what ones minimized or excluded? This fundamental question concerns all high-school subjects, and the nature of the answer may decide the very existence of these subjects as such. The problem cannot be satisfactorily settled by a simple admission that it would be very desirable for every boy to be able to turn out a wooden lamp stand on a lathe and then proceed to make shopwork mandatory for all youngsters of a certain age. A far broader and deeper appreciation of the psychological principles at stake in this very involved matter is needed before a rational solution can be given. The following citation from an earlier effort of the writer to grapple with this fundamental problem may be helpful:

A simple way of introducing some fundamental viewpoints about the extraordinarily difficult problems of effective curriculum construction is to tell a story about my early efforts at self-education in which the joke is on the teller. About the middle of my high-school career, I bought a secondhand copy of Webster's *Unabridged Dictionary*. It was the most expensive single purchase I had ever made with money I had earned myself. Thereupon I proceeded to " study " the dictionary by reading regularly the definitions of words arranged in strict alphabetical sequence. This system I pursued faithfully from the impressive " aardvark " on for almost two years until finally my persistence broke down somewhere in the early K's. I still look back upon this episode as a credit to my drive but as a sorry reflection upon my intelligence.

Unfortunately, it was soon to be followed by another autodidactic endeavor of almost equal futility. When I entered college, it occurred to me that the *Encyclopaedia Britannica* was as valuable as any recommended five-foot shelf of classics, so again I began to read the articles as they succeeded each other on the pages of the successive volumes. This time I cut short the undertaking a little sooner and ended the business with the pages devoted to *California*.

One smiles at this tale of misdirected intellectual effort, but frankly what was wrong? Evidently there was something about the scholastic atmosphere to which I had been exposed which led me to believe that any information *per se* was a genuine good. The pathetic irrelevance of the dictionary arrangement to any vital purpose — other than convenience in locating a needed definition — brought home once for all the conviction that *isolated* knowledge is essentially equivalent to *meaningless* experience. That is why the encyclopaedia plan with its larger and more visible units of understanding marked a distinct advance over the pure lexicon. Nevertheless, this too had obvious and serious defects of organization. The study of Roget's *Thesaurus* would have been a further step in the direction that I now consider desirable, although even this admirable handbook falls short of that *integrated wholeness* which may well prove to be the chief of all pedagogical values. * * *

We all recognize as appropriate curricular questions such problems as *what* to teach as well as what to exclude from the learner's field of experience, *when* to present certain types of developmental stimuli, *how* to arrange the pattern of presentation, *who* shall receive specified kinds of instruction, *where* these processes shall occur, and above all *why* they should be made to happen. These topics touch upon most,

if not all, of the basic items involved in any program of education that the curriculum field easily becomes confused with the whole range of teaching and learning functions. If this be an inadmissible expansion, the confinement of the curriculum problem to a rational determination of instructional *content* — as though a craftsman could change materials without also changing tools and procedures — is an equally repugnant restriction of its scope.

Conceptually, the matter is greatly simplified by considering the mutual adjustment of ends and means as the crux of the situation. A course of study derives its significance from the personal and social goals it serves and consequently stands in an instrumental relation to these objectives. A curriculum for its own sake is a pure monstrosity incapable of survival. A curriculum, like every other set of events in nature, implies something beyond itself; in no sense can it ever be "self-contained." Where there is confusion in curriculum-making two, and only two, causes are generally operative: either uncertainty as to particular aims exists or there is a faulty adaptation of ways for achieving these ends. In my judgment, the correction of these defects is the alpha and omega of all curricular insight. * * *

The curriculum is merely one of the ways in which a society and its component members preserve existing values, make real those that have hitherto been but ideal, and facilitate the emergence and reorganization of different hierarchies of worth. A psychologically sound curriculum must do justice to both the shared values of our culture — the "least common denominator" of a national or world community — and the uniquely personal goods that each organism finds peculiar to its nature. . . . The job of curriculum-construction is the art of providing the form and substance of such experiences as possess the maximum value for the learner. It is doubtful if any other principle of selection and arrangement of educational "goods" is defensible. Not all experiences belong; only those that have "plus" signs potentially attached to them ought to be included; and obviously where positive values seem to clash, the greater good . . . should prevail.[1]

Any curriculum that pupils and teachers plan together is far more likely to meet the personality requirements of all concerned in the

[1] George W. Hartmann, Psychological Basis of Curriculum Development; and, Psychology and Problems of Scope and Sequence, both in *Curriculum Journal*, 1938, 9, pp. 6–10, 105–109.

educative process than one that is unilaterally determined. But even such a course of study must be kept flexible to take advantage of the many incidental learning opportunities which our lack of prescience cannot arrange for in advance; the *actual* curriculum, being nothing more than the activities of the learner himself (and not the *intended* curriculum as outlined in a list of teacher directives), is thus to some extent constantly being made "on the spot." To be wholly without some instructional guide, whether formulated or not, is to work blindly and aimlessly; to be bound to the literal text is to make oneself a slave to one's own handiwork and to deprive oneself of the chance to make better adjustments as the occasions arise. The best curriculum, among other things, permits every pupil to "write his own ticket" and offers the needed help in reaching this chosen destination after a limited number of certain common experiences have been passed. Such a schema does more to resolve the vexing issue of individual differences among learners than most devices for grouping pupils into fast, slow, and medium learners according to intelligence, subject achievement, special maturity levels, etc. It is the most reasonable and satisfactory kind of individualization of instruction ordinarily achievable.

## SUMMARY

During the secondary-school years, the specific learning problems encountered by the pupil increase roughly in proportion to the proliferation of scholarly stimuli that ordinarily occurs in this period. As the pupil makes contact with one new branch of knowledge after another and as he progresses further into the more advanced stretches of each discipline, the intellectual differentiation thus occurring needs to be balanced occasionally by some attention to the integrative aspects of his learning; indeed it seems wise to try to control the rate of differentiation so that it does not occur at a faster pace than the compensating or corresponding integration can be made. Otherwise the "intellectual indigestion" sometimes found among bright adolescents is likely to appear.

Examination of the major fields of instruction at this age level reveals certain issues characteristic of each area. In the social studies, for example, the major task is to orient the learner in time and space, to give him a sense of the working of community institutions, and to develop a regulated zeal for the improvement of these "folkways." The natural sciences are faced with the key problem of turning selected percepts into valid concepts and generalizations of wide applicability. The mastery of elementary physics, chemistry, and biology must begin with the presentation of vivid concrete phenomena and end in the appreciation of principles broad in scope. Reproduction of classic or historic experimental observations has much to recommend it as a means of achieving familiarity with the essentials of scientific method, although the all-important desideratum of attitude, *i.e.*, the recognition of "science" as a mode of thought, can be reached through other channels as well. In the foreign languages, the principal task is to acquire an alternative *system* of verbal expression other than that represented by the learner's native tongue; this structural problem is functionally very much like learning the number system or any comparable set of interdependent symbols. Learning a language takes place best within the culture to which it is indigenous, just as swimming is best acquired in water, the natural medium for this activity.

These instances of "psychologizing" a subject are but illustrative samples of what has, and may be, done with a great variety of organized course content. If the parts of a total curriculum can be fruitfully "psychologized," obviously the whole itself is equally amenable to such treatment. Here curricular organization appears to be most adequately achieved when the complete integration of the individual — whether achieved through "correlation" among separate studies, through the use of "broad fields" rather than specialized courses, through the use of a central "core" to which all instruction is subsidiary, or through a pupil-centered or "experience" program — is maintained and advanced as the primary objective of the entire school program.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. What connection, if any, do you see between the growing organism's constant need for reorientation in a changing world and the noticeable introduction of "orientation" courses into school curricula since 1920? Is the relation purely linguistic or is it more than that?
2. What are the principal psychological factors which explain the air of unreality attaching to any picture of the world in the year 2000 compared to the more vivid impression most of us have concerning American and European life around 1890, even though the present moment is roughly midway between the two dates?
3. Educational psychology, like all "pure" and applied sciences, is a product of the logical capacities of the human being; yet the operations of this logical function are notoriously influenced by many illogical and nonlogical social and personal influences. Is this a fatal defect? How do the procedures of scientific method succeed in coercing consent to the things they reveal? Do they do this as readily in the human and social sciences as in the physical sciences? Why?
4. Are adolescent girls and boys dependable judges of their own needs and interests? How does your answer affect the issue of the ratio of required to elective units in the secondary-school curriculum? What considerations are missing if this is made the exclusive basis of a decision?
5. Translate into any foreign language that you command the following sentence: "The struggle for collective mastery of the conditions of a fuller life, whether with or without organized opposition, is as much a problem of learning, as much a matter of educational psychology, as is the improvement of reading or individual guidance in some scholarly pursuit." Do you find that your approval or disapproval of this idea affects the ease with which you are able to make the translation? What evidence is there that an individual's liking for a nation or for its government affects his readiness to acquire its language?
6. If you were asked by an art teacher to illustrate what is meant by "psychologizing" his field of instruction, what would you proceed to do? Do not try to be exhaustive, yet be sure to offer enough to convey more than a "vague notion."

## *Chapter 16*

# *PSYCHOLOGICAL ASPECTS OF COLLEGE AND UNIVERSITY INSTRUCTION*

If the total number of students now enrolled in full-time educational institutions is considered as 100, the elementary school would claim about 75, the high school 21, and the college but 4. Behind these simple statistical facts lie many concealed economic and psychological forces which are ultimately responsible for the ratios revealed by these figures. The elementary-school population of the United States has entered upon a period of relative, if not absolute, decline in numbers, and the secondary- and collegiate-student group has increased correspondingly. By 1950 or 1960 at the latest, granting present trends, the *average* worker in American industry will be a high-school graduate, a fact rich in social significance; and the attitudinal commitment of most professional educators and dominant lay groups to free public instruction through the junior-college period (about age 20) is all but certain during the next decades to lead to a substantial rise in the number of years of schooling enjoyed by the average man. However, higher education — in conception at least — is not just more of the same thing offered by the "lower" schools continued upward through more mature years; it also differs in its problems and emphases as a result of the special interests and needs of its constituency.

### INDIVIDUALIZATION OF INSTRUCTION ON THE COLLEGE LEVEL

Up to this point, this volume has paid little attention to the question of "individual differences" in endowment and performance

for the very good reason that the research literature commonly subsumed under this head is actually concerned with *group* differences, an entirely different matter and perhaps equally important for certain purposes. Fortunately, it is possible to characterize the results of these group studies quickly since educational psychologists are surprisingly agreed on a common interpretation of them.

Sex differences, for instance, are real and not mythical so far as they refer to those performances directly dependent upon the anatomical and physiological peculiarities of the male and female student, but the intellectual and "temperamental" differences between the sexes are largely traceable to the different roles they are expected to play in group life. There is no difference in mean brightness between boys and girls, although there are notable differences in interests, values, and strength of drives which do affect their fitness and achievement in certain areas. Terman and Miles have shown that there is a characteristic masculinity and femininity which can be distinguished in the mental life of human beings. This can be readily appreciated by means of word-association items like this:

TRAIN engine gown travel whistle

Underlining "engine" gives one a "masculine" score; underlining any of the other terms, but particularly "gown," gives a "feminine" weight. To know the number of persons on an American jury is a masculine "trait"; to answer 16 is a feminine one! Liking chemistry is an M trait; liking spelling an F trait. Highly interesting is the finding that a broad cultural background makes men's minds resemble women's and similarly that high intelligence and education make women's minds resemble men's.[1]

So far as the values and attitudes of the two sexes during and after the college years are concerned, there is no question that men as a rule have higher theoretical, economic, and political norms, while

[1] See L. M. Terman and C. C. Miles, *Sex and Personality*, New York, McGraw-Hill Book Company, Inc., 1936, for an extraordinary miscellany of curious relationships in this puzzling field.

women stand higher in the social, esthetic, and religious values.[1] But as in all cases of group comparisons, the overlap between the two populations is far more impressive than the gap between the central tendencies. Everyone knows that men are *usually* taller and stronger than women, but that there are numerous women who are well beyond the statistically average man in height and even muscular strength. This typical relationship holds for all empirical groupings of the human population and for almost every trait or performance; it is the basic scientific reason why a person must be treated as a person and not as a unit in a class. Neither educational efficiency nor social justice can be achieved by the latter approach.

**Coeducation as an educational issue.** The psychological case for coeducation seems to most American educators to be much stronger than the case for segregation of the sexes for ordinary scholastic purposes. European and particularly Catholic theorists have an elaborate set of arguments to the contrary.[2] American male undergraduates object slightly to the presence of women students in classes and academic buildings, partly because of the emotional distraction they inadvertently create by their mere presence but largely because of the greater prestige attaching, for historical reasons mainly, to the exclusive man's or woman's college. It is significant that female undergraduates do not have this objection to men students as such, suggesting that slight inferiority feelings tend to accompany feminine activities because the male continues to be the dominant sex in our culture. Certainly the fact that teaching has been predominantly a woman's career accounts in part for some aspects of its status when compared with professions almost completely monopolized by men. But there is no warrant whatsoever for modifying the content or method of any course of instruction solely because it enrolls women rather than men;

[1] G. W. Hartmann, Sex Differences in Valuational Attitudes, *Journal of Social Psychology*, 1934, 5, 106–112.

[2] A motion to make Columbia College coeducational in the early 'eighties is said to have been defeated by a remark of Dean Van Amringe to the effect that no one could teach a healthy sophomore calculus in the same class with some attractive young women and that if one could he wasn't worth teaching!

*e.g.*, work in educational psychology is essentially independent of the sex of those who pursue it. Whatever rational adaptation occurs must be to the age, previous preparation, intellectual level, special vocational interests, etc., of the individual student and not to the differentiating but irrelevant factor of sex as such. The establishment of a "sex quota" in professional schools, such as a 10 per cent proportion of women medical students, can be defended, if at all, only by the presumptive failure of married female physicians to engage in health service to the community and thereby return the social investment made in this training.

**The race factor.** The psychological viewpoint with respect to the educational treatment of racial differences is fundamentally the same as that employed in accommodating to those differences due to sex, *viz.*, one of minimizing them as relatively unimportant for the purposes of schooling. There are, of course, race characteristics that are distinctive — skin color, facial outlines, hair texture, and certain other minor bodily features. So much unscientific trash has been written about race differences and public ignorance in this field has so often been artificially fostered by discreditable power groups that the simple scientific facts about them frequently evoke disbelief rather than acceptance. The concept of race is itself a very loose one; although one can speak of whites in contrast with Negroes, within the white classification one is quickly forced to the use of *nationality* criteria as more informing; but even these are almost entirely explicable on historical or cultural grounds as distinct from strictly biological ones. The school achievement of Jewish students is as noticeably above the mean of the whites as a whole as the Italian pupils' is below, a fact better accounted for in terms of specific selection, scholarly traditions, minority status, and drive than in terms of inherent ability to learn. Persons of Asiatic origin typically do as well in our colleges as persons of European origin; indeed, all the test evidence now at hand indicates that the educational *possibilities* (as distinct from educational *attainments*) of all races and nationalities are approximately the same.

In the United States, whatever anti-alien sentiment exists fortunately has little effect upon the ordinary operations of the school, but the dual system of schools in the South is part of a general social dichotomy between the blacks and whites, which, while understandable in the light of cultural evolution, has no support from educational psychology as such. There is no question that Negroes consistently do more poorly on intelligence and achievement tests than a comparable group of whites, but the region of like scores is very great. In the light of what now seems possible in the way of IQ raising, the lack of equal educational opportunity early in life, broadly interpreted, seems to be primarily responsible for the lower mean performance of colored students. To treat a learner differently solely because he is a Negro, a Jew, a Slovak, or a member of any identifiable human group other than the one dominant in the community is an erratic form of behavior whose full explanation really belongs in the domain of psychopathology and irrational politics rather than in the field of educational psychology per se.

**Debate about "homogeneous" grouping.** While grouping for educational purposes according to sex or race is properly repudiated as an instructional procedure, grouping according to developmental age, amount of previous preparation, and special interest is eminently sound, especially if the size of the population is large enough to make such separations feasible. However, the issue of "homogeneous grouping" according to differences in brightness level of the students is one on which professional opinion is sharply divided. The group that favors teaching bright and dull learners, respectively, apart from the rest or "average" sections of the student population — a scheme typified by the so-called X–Y–Z plan in which the normal or Y class is the largest — argues that the strictly academic progress of each category of brightness is greatest under this method. The group that opposes homogeneous grouping holds that many important educational values are lost when pupils of noticeably different degrees of abstract intelligence are not brought into fruitful social contact with each other. Both claims are true; but both appear to miss the heart of the

question if the following excerpts from the writer's earlier analysis of this topic is still valid:

In the strict logical sense of the word, there is no such thing as a perfectly homogeneous school group. Any collection of individuals can be homogeneous only with respect to some *one* feature, quality, or trait which is possessed in equal amounts by all members of the group. An aggregation which is approximately homogeneous or uniform in one variable, such as height, may be and usually is remarkably heterogeneous in all other matters, such as age, weight, etc. Consequently, any alleged homogeneous group is only relatively so. * * *

. . . In the typical unclassified group, the average intellect is the one at which the ordinary teacher inevitably aims, with the result that the bright pupil is bored and the duller one mystified. If an alert and scholarly instructor attempts to raise standards by appealing to the abler students, the area of mystification is extended to include the great middle region. If, on the other hand, a lenient pedagogue permits the poorest representatives to set the pace, he is fortunate if he escapes the protests of the rest, who are rightly annoyed by excessive overlapping, babyish methods, and related evils. * * *

. . . Originally, grouping was built upon the available intelligence quotients, which is still the most feasible method where no other information is available. But under normal circumstances accomplishment records, or placement examinations, furnish a superior basis of classification. Present ability is the best predictor of future ability and past performance the best index of ultimate achievement. It is this principle of similarity which explains why scores upon an objective test in freshman English offer a more reliable prophecy of the work which will be done in sophomore English than intelligence scores. Consequently, ability grouping should, with the exception of the first few grades, be based upon relative competence in various fields of instruction. It is perfectly possible, although unlikely, for a pupil to be simultaneously a member of an X group in English, a Y group in history, and a Z group in arithmetic.

The advantages of homogeneous grouping which result whenever the school system is large enough to employ it are easily appreciated. The better adjustment of the pupil to his work raises the scholastic morale of all groups. The superior student benefits by the keener competition of his fellows and is less subject to the moral deterioration which comes from working at any plane other than one's best.

The average person gains by the elimination of the incompetent from his ranks; and the less well-endowed are spared the deadening sense of frustration and defeat which comes from the daily reminders of inferiority in the form of unfavorable comparisons. * * *

Perhaps the commonest objection to homogeneous grouping is that which alleges it to be "undemocratic." This is like damning evolution and science for being "unchristian." We do not consider it undemocratic to exclude cripples, deaf men, and consumptives from our football squads; and no sane man would recommend an imbecile for admission to the graduate school. Everyone recognizes the necessity for special training of the feebleminded; then why neglect the subtler variations among so-called normals? . . . More impressive is the objection that children do not fall into natural ability groups since abilities form an unbroken continuum; groups which appear relatively homogeneous at the time of classification soon vary more within themselves than they do from each other; different types and amounts of instruction are required by different pupils within each group. Ability grouping does not solve definitely the problem of adapting schools to individual differences. * * *

. . . The true defect of homogeneous grouping, as I see it, is that it is only a half-way measure. . . . Effective education can never be mass education. It is a personal, individual process. One must never confound instruments and methods of scientific research or administrative convenience with the instruments and methods of the art of teaching. If the pupil is not singled out for guidance as a unique personality, he is just as effectively buried in any Y group (*i.e.*, the middle 60 per cent) as in the original undifferentiated collection from which he emerged. * * *

. . . Homogeneous grouping is merely a tool or device — a preliminary step on the way toward complete individualization of all instruction . . . Perhaps the maturest judgment one can make is that ability grouping was good in its day but is no longer the wisest solution. Here, as in so many other practical situations, the good may become the enemy of the best! [1]

**Some doubts about some kinds of "individualization."** The foregoing considerations apply throughout the educational ladder, but

[1] George W. Hartmann, The Next Step in Homogeneous Grouping, *Educational Method*, 1933, 13, 141–144.

they seem to be peculiarly applicable to the college years where efforts to "individualize" the program have gone on apace ever since the elective system became general. Individualization in any course occurs when the student can propose his own objectives in it and receive the aid of the instructor or other officers in carrying on his self-determined activities. It rarely happens that one and only one kind of reading or writing assignment is required to reach the proficiency that a college course may properly expect. If a sophomore is taking work in the history of philosophy, he may rightly be encouraged to cover different sources than those preferred by his classmates, to think about different major problems in this field and to write on such themes as he pleases, always provided, of course, that these affairs all have some pertinence to the broad field that contains them. The class discussions and lectures offer experiences shared in common by every enrollee, but beyond this base personal differentiation of work should occur. As might be anticipated, the success of any individualization tactic in improving the individual and his cultural resources depends not upon the method per se, but upon the personalities of the teacher and student involved as the extracts from the research evidence below suggest:

It has long been assumed that one of the main, if not the main, educational losses resulting from large classes is the diminution of personal contact between student and teacher. No one doubts that a reduction in pupil-instructor intimacy normally and inevitably accompanies an increase in the size of the group to be taught — a fact which has been deplored by most lay and professional observers. It is also commonly held that an absence of individual attention must lead to lowered achievement. Recent studies on class size have made this belief less tenable than formerly, but the conviction nevertheless persists. * * *

A neglected aspect of this problem is the fact that not all pupil-teacher contacts have positive educational value. The clerical routine of college registration and mechanical advisory functions are rarely inspiring, and may even hinder rather than foster the best conditions for mental growth. Moreover, no teacher can get along equally well with every pupil and *vice versa*, so that a certain measure of selectivity

(attraction and avoidance) in these personal relations is inevitable. A final consideration is that a few minutes' intercourse with a gifted or renowned personality may be more rewarding than days spent in the presence of mediocrity. * * *

Will a student do better work in an elementary psychology course when he is given a brief office conference with the instructor in lieu of attending one of the class lecture or recitation periods? Does this slight reduction in the mental and social distance between the student and instructor affect the pupil's ultimate standing on objective tests and examinations given during the course?

. . . For the purposes of this experiment, the class was divided into two groups of fifty-six students each. These groups were previously matched on the basis of their average college grades. Group A, the control group, was required to attend the class regularly three times weekly and to participate in all the lectures, recitations and demonstrations. Group B, the experimental group, was forbidden to come to class for the third hour, but instead directed to make appointments for a twenty-minute conference with the instructor monthly. Three such conferences were held with each student in Group B during the term. During each individual session a discussion of the student's past and present reading in the course occurred and a plan for some original form of essay writing or experimental report was developed. This yielded an imperfect sort of tutorial system — a compromise adapted to the exigencies of mass instruction in a typical American state university.

Under the scheme, Group B was deprived of one full hour's recitation or lecture weekly, but received in return the privilege of three brief personal conferences which were denied to Group A. Apart from this, all work done by the two groups was of the same nature and amount. Consequently, the specific question to be solved by this arrangement was: What different levels of mastery of subject-matter result from formal group learning as distinguished from individual consultations? Three extensive objective-type tests based upon a common text formed the basis of the comparison. * * *

The quantitative record clearly favors the control group. On the first test, the chances are 90 in 100 in favor of it, on the second 87 in 100, and on the third 98.9 in 100. . . . Only in the case of the term papers is there any evidence of greater achievement by the experimental group. It is, therefore, highly probable, even if not wholly certain, that our A group derived more tangible gains from the term's work

than did the *B* group, despite its lack of the putative benefits of face-to-face relations with the instructor.

On the surface, these findings offer no support to the clamor for more individualized teaching on the college level, at least so far as elementary or "orientation" courses are concerned. Merely knowing the teacher as such and talking with him about pertinent intellectual affairs exercises no visible influence upon the learner's willingness or ability to master the facts, technique or viewpoint of introductory psychology. To be sure, these benefits may and probably do occur when the personal contacts are *in addition* to the regular activities of the classroom, but when they are used as a *substitute* for a part of them (as in this study), they fail to produce equivalent results. * * *

Possibly the avowed craving of many undergraduates for more teacher contact is simply a form of self-assertiveness — a way of bringing "my" problems and "my" ideas to the front. It probably wounds a student to be neglected, but if the instructor tries to remedy this by spreading his personality systematically and evenly over all, he still fails to meet the special wants of those individuals who can only be satisfied by distinct social prerogatives not shared by the rest of their associates. In short, a little personal treatment may make students a bit happier since 73% of the group liked the plan.[1]

**An experiment in "time saving" for students.** Implied in the foregoing is the possibility that college classes may meet oftener than necessary for optimal results. Even on *a priori* grounds, it is *highly* improbable that the amount a student learns about a certain subject is directly proportional to the amount of time he spends in class lectures or discussions devoted to it. Five 50-minute periods weekly cannot be expected to produce 2½ times as much knowledge as one 100-minute period. Comparisons on the basis of efficiency achieved per minute are difficult, but not impossible; those that have been attempted suggest that much undergraduate time could profitably be released for individual study by a reduction in the frequency of regular class meetings. Note the evidence below:

[1] George W. Hartmann, Comparative Pupil Gains under Individual Conference and Classroom Instruction, *Journal of Educational Psychology*, 1935, 26, 367–372.

What is the effect of differences in teaching time upon student ability in an academic subject? If classes A and B, taught by the same instructor and equated for initial ability, are so administered that A meets three hours weekly and B only two hours, what differences in accomplishment are measurable at the end of the course? Will the extra hour render A superior, equal, or inferior in achievement to B? * * *

Two divisions of elementary psychology used the same pair of standard textbooks, met in the same room, performed the same experiments, and witnessed the same demonstrations. A mimeographed syllabus outlining the topics of the course was distributed to both groups with the admonition that they would be held responsible for some acquaintance with all the items in the outline, even though they might not be covered in detail during the semester. This was designed to facilitate individual library work. A selected reference shelf of twelve " classics " dealing with various branches of psychology was reserved for the members of the class, and familiarity with some portions of each demanded. The sole difference between the two sections was that Group B had only two lecture-recitation periods weekly while Group A had three. Group B was encouraged to use the free hour for wider reading but similar recommendations were made to Group A. The instructor obviously had to compress the substance of his lectures more with Group B, eliminating minor points, reducing the variety of illustration, and abbreviating student inquiries; in Group A, on the other hand, the extra hour was used for stressing technical distinctions, presenting illustrative material, such as slides, charts, etc., and informal discussion. A student in Group B normally attended class only 67 percent as often as one enrolled in Group A. Yet the amount of progress in factual knowledge was indistinguishable. * * *

In the elementary class, each of the 25 individuals in Group A was paired for native ability as measured by a standard intelligence test with a corresponding member of Group B. . . . No difficulty was encountered in assigning mates, as only 3 differences out of 25 were greater than 2, the largest discrepancy being 9 points in intelligence. . . . Table XV gives the final averages for these groups of approximately equal capacity.

It is obvious that where there are only 62 chances in 100 of a real difference being present, the variation between the two averages is quite insignificant.

*Table* XV. *Comparative Scores in Elementary Psychology when Intelligence Is a Constant*

| Group | N | Average Intelligence | S.D. | Final Average | S.D. |
|---|---|---|---|---|---|
| A | 25 | 94.6 | 24.7 | 130.02 | 11.53 |
| B | 25 | 93.75 | 24.3 | 128.9 | 13.7 |
| | | | | D = 1.12 | |
| | | | | $\sigma_{Diff}$ = 3.57 | |
| | | | | $D/\sigma_{Diff}$ = 0.31 | |

In addition, it was thought desirable to match the groups separately for specific psychological knowledge. It is conceivable that of two persons with the same intellectual endowment, one may begin the course with a greater acquaintance with particular facts of human nature. Consequently, the subjects in both groups were equated on the basis of their pre-test scores. Only 4 differences out of 25 were greater than 2, the largest divergence being 14 points; this was balanced, however, by a zero difference in fully half the cases. Table XVI gives the final averages when the initial test scores are equalized; the pairs in this Table are all distinct from those in Table XV.

*Table* XVI. *Comparative Scores in Elementary Psychology when Initial Knowledge Is Held Constant*

| Group | N | Pretest Average | S.D. | Final Average | S.D. |
|---|---|---|---|---|---|
| A | 25 | 112.0 | 9.73 | 130.02 | 11.53 |
| B | 25 | 112.9 | 10.5 | 134.16 | 10.8 |
| | | | | D = 4.14 | |
| | | | | $\sigma_{Diff}$ = 3.16 | |
| | | | | $D/\sigma_{Diff}$ = 1.31 | |

The obtained difference between the averages is 1.31 times its sigma, giving 90 chances in 100 of a true difference. These figures should be contrasted with those for Table XV. Whereas in Table XV the chances mildly favored the group meeting *more* often, in Table XVI the situation is reversed more positively in favor of the class meeting *less* often. Apparently students of equal ability and preparation can learn as much of a given subject-matter in less than the standard number of class hours as those who are held to the full schedule requirements.[1]

[1] G. W. Hartmann, Economy of Time in College Instruction, *Journal of Educational Research*, 1931, 23, 404–409.

The varied attempts to individualize instruction on the college level point to the conclusion that almost any teaching technique is successful if it awakens the interest of the student and motivates him to further his own intellectual growth and educational accomplishment. It may be, as Carter Good suggests, that *any* experimental method is superior to a more traditional scheme because both instructor and pupils are energized by its very newness to them; the stimulation is akin to that produced by a change of scenery and climate. Part of the improvement then noticed must be attributed to the factor of novelty rather than ascribed altogether to the method *qua* method.

## STUDENT RATING OF INSTRUCTORS AS A DEVICE FOR IMPROVING COLLEGE TEACHING

The college-classroom situation is usually a "polarized" group relationship in the sense that an audience of young adults finds its behavior under these circumstances controlled almost entirely by the professor in charge. An important cluster of psychological problems arising out of these lecture-discussion settings concerns not the specific learning difficulties of the students as they center about the scholarly content of their work, but deals with the more subtle influences that two organisms exert upon each other by this process of interstimulation. When a geology professor conducts a class, the students are not responding exclusively to "geology" or "science" as experiential stuff during that period — they are also engaged in varying degrees in reacting to the professor as a human being. Although there are obvious defects in the view which holds that the student is the "consumer" of teaching services and that as patron or "customer" all university procedures must be designed to please him, it is nonetheless true that the ordinary student is reasonably serious in his purposes and that his suggestions for bettering the work of a course are often helpful in making improvements that are recognized as such by the instructors.

One way of accomplishing this general purpose is to reverse the usual role of judge and person judged by securing ratings of the in-

structors by the students, who should certainly be in possession of some important evidence about an individual's competence in classroom guidance. The fear that students will give "wise-crack" rather than genuine judgments is hardly justified since the mean ratings submitted independently by different pupil groups agree very closely; they also harmonize with insightful self-appraisals made by an objectively minded teacher and coincide closely with estimates of colleagues and superiors. Moreover, all persons are rating each other constantly, and it would seem but sensible to make these ratings under better and more comparable conditions than is the case where they are informally and incompletely expressed.

Figure 57 shows a teacher-rating scale developed by the writer for use with undergraduate students.[1] Copies of a sheet like this can be distributed to a class at the end of a term's work after the students have had ample opportunity to become acquainted with these aspects of their instructor's personality. The teacher can then "score" himself by joining together the means for the 10 variables into a profile, the heights and depths of which will reflect his strong and weak points as seen by those who are watching him in a characteristic professional role. With such a chart in his possession, it would be a poor peda-

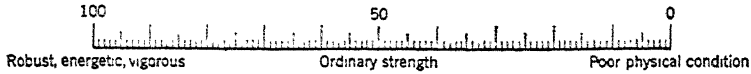
---

*Note to Students.* Following is a list of qualities that, taken together, tend to make any instructor the sort of instructor that he is. Of course, no one is ideal in all of these qualities, but some approach this ideal to a much greater extent than do others. In order to obtain information which may lead to the improvement of instruction, you are asked to rate your instructor on the indicated qualities by making a check ( $\surd$ ) on the line at the point which most nearly describes him with reference to the quality you are considering.

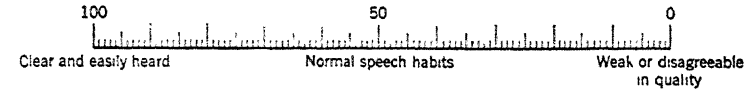
This rating is to be entirely impersonal. Do not sign your name or make any other mark on the paper which could serve to identify the rater. Be sure to put your check *on the line* where you think it should be to express your judgment of the instructor.

[1] The wording of the "directions" is taken from an earlier rating sheet developed by Brandenberg and Remmers at Purdue. The "items" to be rated, however, are quite different.

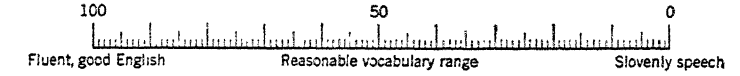
1. HEALTH



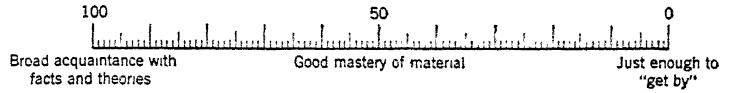

2. VOICE



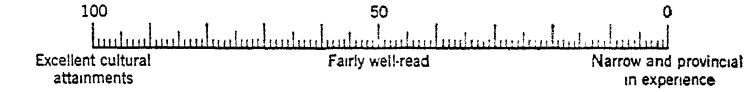

3 COMMAND OF LANGUAGE



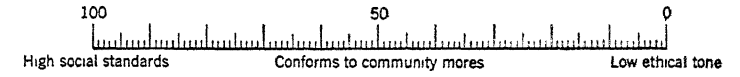

4 SCHOLARSHIP WITHIN SPECIAL FIELD OF INSTRUCTION



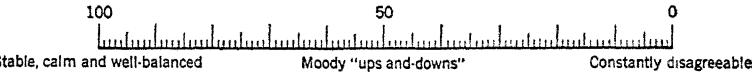

5 GENERAL INFORMATION AND BREADTH OF INTERESTS



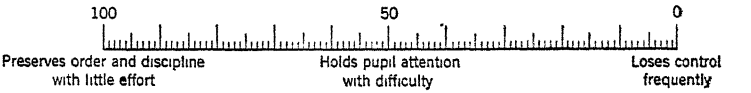

6 IDEALISM



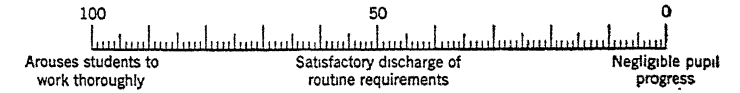

7. DISPOSITION AND TEMPERAMENT




8. CLASSROOM EFFICIENCY




9. ABILITY TO MOTIVATE LEARNING




10. LEADERSHIP

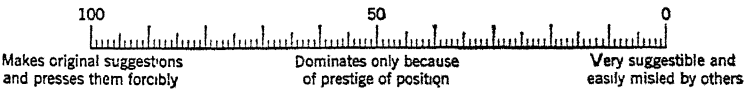



FIGURE 57

gogue who would not find himself motivated to act in a way that lifted his performance in the areas where such improvement was most plainly indicated. Such a procedure may seem crude in the light of the more rigorous canons which can be applied in other sectors of educational psychology, but it is nonetheless one of the easiest and most direct ways of keeping the quality of classroom instruction at as high a level as the teacher's own powers permit.

The traits which appear on the typical rating scale are not personal attributes of equal modifiability, but all of them (including the most inflexible physical qualities) are plastic to some degree. If, for instance, an instructor finds that his students consider his "general information and breadth of interests" to be relatively low, there are certain well-defined procedures by which he can correct this impression; indeed, compensatory mechanisms may be thrown into action by which he can ultimately become positively distinguished for the very thing in which he was noticeably weak. Such self-analysis and self-education of the teaching staff are highly professionalized forms of adult learning that could be developed to a much greater extent than is commonly the case.

## TEACHER TRAINING AS A SPECIALIZED EDUCATIONAL PROCESS

It is often forgotten that teachers themselves were all pupils at one time and that there are many interesting psychological problems involved in the selective or transitional process by which certain pupils become teachers of others after them. What are the differentiating factors about certain learners which account for their "affinity" for a teaching career, whereas others who are very similar if not better in many important respects are repelled by it? Teaching covers a great variety of functions but it always consists in some personal agent for conveying knowledge, attitude, or skill to a recipient. There are more than a million workers in various forms of educational service in the United States at the present time; of these, over 50,000 are in colleges and universities while most of the remainder are found in public elementary and secondary schools; elementary teachers out-

number secondary teachers roughly in a ratio of 2:1. The staff members of most institutions of higher learning are usually scholarly specialists in certain sharply restricted areas of human knowledge whose competence in their fields is generally guaranteed by the rigorous sifting of competitive examinations and the "public" character of their contributions and activities; the research emphasis, too, makes it possible to judge their work by an appeal to a qualified tribunal of peers. The work of most school teachers, however, seems to produce less tangible results and they have been subjected to severe criticism in those surveys which have made much of their real or fancied inadequacies as a group.

Of these, the Pennsylvania Inquiry of the Carnegie Foundation for the Advancement of Teaching is the most important. Between 1928 and 1932, it tested the intelligence and academic achievement of the students enrolled in almost all the colleges and normal schools of that state. The most important single instrument used in making these comparisons was a "general-culture" test covering almost all the standard subjects commonly offered in a liberal-arts curriculum. In almost every area of instruction, those college seniors who planned to be teachers did more poorly than those who had chosen some other occupational outlet for themselves. The differences were consistent and often pronounced. On the face of the returns, there is no question that students who expect to teach possess on the average an intellectual, scholarly, and professional equipment inferior to that of students going into most other vocations. It is also highly probable that the situation in Pennsylvania is a fairly faithful sample of the national scene so far as these comparisons go. Apparently the special curricula devised for preparing teachers have not been successful in attracting exceptional minds or in giving them a more substantial background of general academic knowledge.

**How stupid are those who teach others?** This is a serious state of affairs.[1] At its worst it would mean that only the relatively dull and unscholarly among college graduates are being drawn to serve as in-

[1] Just how "serious" this is will be explained on p. 500.

structors of youth. If such is literally the case, then the local communities which hire teachers must accept a considerable share of responsibility for making the work they want done in their schools so unattractive that only marginal personalities can be drawn into it. It is quite true that no profession can be much better than the individuals who comprise it and if future public-school teachers as a group are outshone scholastically by their classmates with nonteacher ambitions, then it is clear that some large-scale vocational maladaptation is occurring.

Equally disturbing is the large overlap in scores between college seniors who expect to teach and high-school seniors of the type they will actually be instructing. In the accompanying chart (Figure 58) it will be seen that nearly 18 per cent of the younger group have better vocabularies than 48 per cent of the group four years older on the point of leaving college "prepared" to teach; and 17 per cent of the teacher specialists in science have lower scores than 31 per cent of those still in high school who do best in science. As Learned says in commenting on these findings,

> The tests disclose a condition which, if made the basis of a pupil-teacher relationship, would render healthy learning impossible. Wherever, between a given teacher and his pupil, normal relations in respect to relevant knowledge are thus actually reversed, and the teacher exhausts his service in mere class manipulation and routine, he might better be dispensed with altogether.[1]

There is a sense in which the implications of the Carnegie report, while black enough, appear to be a bit overdrawn. All large groups, as was noted at the beginning of this chapter, overlap to some extent with other categories of the population; in fact, statisticians hold that almost every kind of performance of which the human race is capable could be found represented somewhere within the total population of 12-year-olds. There is therefore nothing especially startling about the

[1] W. S. Learned, *Tested Achievement of Prospective Teachers in Pennsylvania*, 31st Annual Report of the Carnegie Foundation for the Advancement of Teaching, 1936.

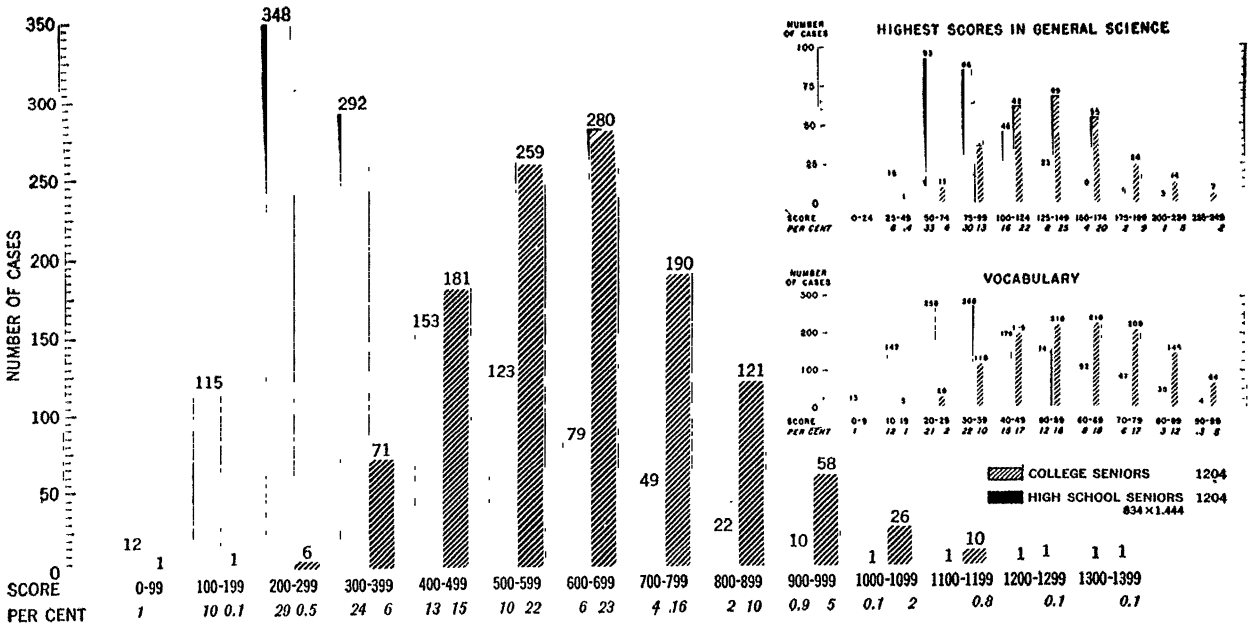



FIGURE 58

Data from the Carnegie Pennsylvania Study comparing achievement scores of prospective teachers and their prospective pupils.

manifest overlap between teachers and students — to a psychologist a complete absence of overlap would be far more surprising! The distributions of practicing teachers, lawyers, engineers, physicians, clergymen, and other "learned" professions would overlap too were they all given a common test of general culture. While the means of the teachers might be lower, some of them would undoubtedly be found in the very top percentiles. Teachers are as numerous as all the other occupations just mentioned put together, and it is inevitable that the median score of a million persons in a certain career should be lower than those of a hundred thousand in another if the only way in which the added numbers can be secured is to dig deeper into the lower levels of ability after the top layer has been exhausted. In addition, the average teacher comes from a less privileged socio-economic stratum than the average representative of the occupations with which he is often compared — this indubitably serves to depress his performance in the ways outlined in Chapter 7.

## SUMMARY

The application of educational psychology to the college and university field is largely an upward extension of the techniques that have been used in much greater profusion at the so-called "lower" levels. Remedial reading must often be undertaken with undergraduates; many of them are ignorant of simple "how-to-study" hints and their errors in English and mathematics follow the general pattern set in earlier years. However, there are some problems peculiar to this period, most of which center about the recognition of the individual either through preceptorial and tutorial techniques or through some other suitable adjustment in instructional methodology. Differential *group* treatment according to race and sex in matters educational cannot be countenanced on strictly psychological grounds, but *individual* accommodation in the light of these factors may be entirely reasonable. Homogeneous grouping based on ability measures may still be employed to further educational ends, but this and related administrative devices are largely compromises with the ideal of as

complete individualization of instruction as is consistent with the values of social stimulation and group learning.

Teaching at the college level, at least in those cases where the research emphasis is not as basic as it is in university or professional instruction, depends heavily for its effectiveness upon the reception which the instructor's personality receives among the students. The many instances where a professor really "knows his stuff" but is unable to "put it across" to his audience represent educational tragedies from the standpoint of all affected thereby. Student ratings of teachers, especially when solicited and administered under conditions which protect their dependability, are useful sources of information about items that are otherwise in danger of being overlooked. They also serve as incentives to make the adaptations suggested by them.

The collegiate preparation and performance of teachers, to judge from the records supplied by the Carnegie Pennsylvania Study, are not as high as those of nonteachers engaged in essentially the same undergraduate program of courses. These facts are capable of many different interpretations, but there is no escape from them as data that reflect upon the attractiveness and pulling power of the public-school teacher's career. The causal factors lie deep in the personal history of every potential school teacher and in the complicated socio-economic structure of American life which has produced the general valuation assigned to this form of community service as compared with others.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Even though women have amply demonstrated their capacity to pursue almost any university subject with the same success as men, is it really best for them and for others that the curricula of the separate women's colleges should be almost exact counterparts of the courses taken by their brothers at other institutions? Is there any psychological justification whatsoever for the independent man's or woman's college? Are there any valid social or economic reasons for their continued existence?
2. Are there any organic race differences that account for the alleged

musical and philosophical leadership of the Germans, the "political genius" of the English, the artistic pre-eminence of the French, the engineering and business skill of the Americans, etc.? To what factors do you attribute these special excellences and superiorities, assuming them to be as stated?

3. How would you administer the principle of "homogeneous grouping" with 1,000 sophomores taking an introductory course in psychology at a large state university so as to preserve all legitimate educational and social values in the process? Take care to answer the usual objections encountered in this effort.
4. Is the common demand for the "personalization" of college instruction motivated chiefly by an interest in attaining the best possible education for oneself?
5. Prepare a rating scale for college teachers similar to the one illustrated in this chapter but containing entirely different traits or qualities to be judged. Include those attributes which your experience as a student has led you to prize when they appear strongly in your instructors and to regret when they are low or absent. Use it to rate three professors known to yourself and at least two other persons (students). Comment on the amount of disagreement and agreement shown in the respective "profiles."
6. Is there any "joker" in the finding that students learn about as much in a course meeting twice a week as in one meeting four times weekly? Is this finding comparable in any way to the discovery that class size does not noticeably affect the achievement of the individual student under the usual methods of university instruction?
7. Many studies of public-school teachers seem to show them (*a*) poorly informed in their own special subject of instruction, (*b*) extremely conservative in their social philosophy, and (*c*) lower in "general culture" than most other college graduates. What reservations do you feel are warranted before accepting these conclusions as they stand? Are the norms or standards which are necessarily involved in making these judgments themselves free from serious limitations?
8. Outline specifically your ideal marking system from the standpoint of providing the maximum help and information to (*a*) the student himself and (*b*) those who may for any reason be interested in the student.

## *Chapter 17*

# *EDUCATIONAL PSYCHOLOGY AND SOME ASPECTS OF ADULT CITIZENSHIP*

In this final chapter, we shall aim to develop a few large issues which arise from the inevitable marriage of educational psychology and social psychology. Most of these questions grow out of the frequent impossibility of dealing with persons as isolated individuals and the necessity of treating them as members of large, cohesive groups. The psychological problems of education are not exhausted by an analysis of those that occur in connection with the pupil or the teacher, although these undoubtedly are, and must remain, primary; many of them concern the administrative officers, the parents, and that generalized but fearsome lay figure known as the "taxpayer."

Face-to-face relations — *i.e.*, person-to-person contacts — may be maintained in much of the ordinary activity of the school, but as the number of participants increases, these tend to be reduced in favor of group representation through delegates. The multiplication of human associations of all sorts with the growth in agencies of communication and the urbanization of modern life has intensified the adjustment demands made upon everyone. Many of these issues are outright matters of mental hygiene (because they contribute to the appalling load of neuroticism which civilization today seems to create) and some are simply matters of technical proficiency in managing "private" and "public" affairs; all, however, are pertinent to the educative process and rich in psychological content, as the following examples will amply demonstrate.

## A. THE FIELD OF ADULT LEARNING

There is no sharp biological line which separates a youth from an adult — the designation of all persons 21 or over as adults is a legal artifact and a very rough approximation to the truth in each case. The nature of modern life is such that adults so classified commonly find that adaptations learned in their earlier years become maladaptive later and force upon them the necessity of new adjustments. This means fresh learning. The real and artificial barriers which an older person encounters in his efforts to master new experiences prescribe the methods by which adult education seeks to accomplish its objectives.

It is customary to think of adult learning as confined largely to postschool or nonschool occasions, although the fact that the average Ph.D. is 28 years old at the time he wins this degree shows that much if not most university instruction is rightly classified as adult learning. The special psychology of learning in maturer years acquires its significance less from the presence of men and women in the thirties and forties and beyond in "school" situations and more from the general social phenomenon of an aging population. The median age of the people of the United States increased from 17.2 in 1830 to 26.4 in 1930, a change due almost entirely to reduced infant mortality, diminished birth rate, increased longevity of the average person as a result of healthier living conditions, etc. An interest in adult education also arises out of the efforts of social reformers to achieve certain manifestly desirable results, only to find them blocked by the hostile attitudes of persons in control of social institutions, who of necessity are not children or youths but individuals in middle life and beyond.

During the last two decades, educational psychology has penetrated into this area of the way in which grown-ups make their adaptations, and the findings unanimously show that people are rarely too old to learn. It is much truer to say that an organism can be too young to learn well. Comparative studies indicate that the sheer speed of acquiring new adjustments (as tested principally by simple code-sub-

stitution tests in the laboratory) is at its maximum somewhere between 20 and 25 — the very years when most persons are not in school. Apparently we have arranged a system whereby we concentrate upon learning at a period in life when we are well below our maximum in modifiability. This, of course, does not apply to all types of learning, for some functions mature at a different rate than others. The most important generalization one can make in this area is that persons aged 40 to 70 can learn as readily as they could when they were 8 to 14 years old, a period popularly assumed to be representative of the very peak of modifiability. When an individual attributes to his age his inability to learn something, he is more likely to lack the drive or the intelligence necessary to the task; under such circumstances he would have failed at 13 as well as at 55.

**Low or weak " drive " as a major block.** The principal barrier to free and effective adult learning is a motivational one. It is not just school children who lack interest in study — this same deficiency also afflicts their teachers in very similar subjects! Merely destroying the popular superstition that one cannot really learn after the age of 20 does not release the learning energies of adults unless they can be made to care about improving their competence in some respect. Even this must be balanced against existing attractions. Their values may emphasize continuing along the paths already begun and not branching off into other territory; *e.g.*, a lawyer at 45 will not normally pursue medical studies at that age, not because he is averse to them, but because his family's livelihood and his own prestige rest upon his discharging his legal duties and not upon any qualifications he may have as a potential physician. In other words, it is literally true that many adults cannot afford to allow themselves to become interested in too many things, for this means a dispersion of effort that may injure other more fundamental values. Adult education in the case just cited must concentrate upon making the lawyer a better lawyer, *i.e.*, seeing that he does not stand still in his assimilation of new and better concepts and practices, making up for any " shortages " that may have been left unfilled by his earlier training, and ensuring a breadth of

familiarity with the human and social functions of the law. Sheer dilettantism and versatility in a variety of minor activities, apart from a legitimate amusement or entertainment value, will not appear to be a very worthy goal in the eyes of most adults.

The problem of adult learning is more a matter of providing a suitable and attractive curriculum and less a matter of sheer capacity. The chief limitation of older adults lies in the speed function, largely due to the inevitable decline in the amount of energy available for any purpose; but the more important and indispensable function of "power" and "level" of understanding seems to remain stable at a high plane until the senility of really advanced years develops. A man can solve as hard an intellectual problem at age 60 as at age 24, but if he had to learn a new task, he would take about 10 to 20 per cent on the average more time to reach the same degree of excellence. Obviously time is much less crucial than "power" in dealing with most adaptive requirements of the human organism. Moreover, it is well to emphasize that individual differences are as marked in this area as in any other; many adults of 70 or 80 are far superior to the average youth in intellectual agility or power, although they may by that age be noticeably below their own performance when they were in their "prime."

While all the experimental evidence at hand convincingly shows that older adults *can* learn, and learn almost as well as they ever could, this should not be interpreted to mean that they actually *do* learn. Particularly in respect to basic-attitude transformation are the resistances severe. The fundamental life beliefs of an individual apparently cannot be disturbed without a protesting struggle against this upset of his total orientational pattern and the accompanying threat to his emotional security. Most of the older studies on religious conversion report that this phenomenon is concentrated in high adolescence, and that if a person is not converted by 20 or at the latest by 30, the chances of this ever happening are infinitesimal. Rigidity of the basic frame of reference that a person uses in interpreting the universe appears in the imperviousness of atheists to theistic arguments and vice

versa.[1] Many of the tragedies of adult life center about the irreconcilable clashes of high-minded and utterly sincere personalities, and it must be confessed that neither psychology nor any other discipline has developed a really adequate technique for dealing effectively with these situations. To search persistently for common ground is the most practical recommendation that can be offered. Individuals do frequently change their "isolated" opinions or judgments about limited issues, persons, or groups, but a shift with respect to their entire value hierarchy is rare; *i.e.*, people may typically be brought to increase their liking for the Germans as human beings by the evidence of their cleanliness, orderliness, industriousness, etc., but that is largely because these firmer values are now attached to a group with which they were not formerly clearly associated; the values themselves as part of the central reference "theme" of a person's life are characteristically immobile in adult years. There is a certain survival advantage in this, of course; but it is also the source of the most obdurate difficulties encountered by adult education.

## B. ADMINISTRATION AND SUPERVISION AS THE PSYCHOLOGIST SEES IT

The internal government of the school system, like that of any other institution of considerable scope, proceeds smoothly to the degree that its adult personnel are masters of the art of associative endeavor. This is a complex skill, unevenly acquired by different members, but it appears in such matters as recognizing that a "work" committee designed to complete an authorized project should be relatively small, say 3 to 5 members, and that an advisory committee or "council" should be somewhat larger, say 7 to 12, since the intent in the latter case is to secure representation for the widest variety of viewpoints; the difference in assigned or expected function dictates the specific structure of each committee. It is the special business of

[1] *Cf.* Walter Watson and George W. Hartmann, The Rigidity of a Basic Attitudinal Frame, *Journal of Abnormal and Social Psychology*, 1939, 34, 314–335.

the administrators of the educational enterprise to co-ordinate the various parts of the total operation so that everything moves in a common direction understood and approved by all. The administrator typically is the expert in unifying diverse and often conflicting purposes, all to the end that everyone involved in the school will be able to do best the work he wants to do. As with most other occupational activity, the ultimate task of the administrator is to arrange the situation so that he becomes " useless " and unnecessary; *i.e.*, free from the obligation of intervening as a *deus ex machina* or as a court of last resort in the daily routine of the school plant.

Perhaps the first concept to be employed in this area is the recognition that any local school organization is inevitably a gestalt of some kind — a system whose parts are dynamically connected in such a way that a change of one part results in a change of all other parts. Much curriculum-building clashes violently with the implied principle since changes occur largely through addition and not through reshaping. All social configurations, as contrasted with perceptual or objective physical configurations, are characteristically " weak " or loose gestalten rather than " strong " ones; *i.e.*, a tightly knit or closely interdependent structure is the end term of a series of such cases rather than the midpoint. But the parallels are nonetheless very close; *i.e.*, gradual changes in the human " elements " that comprise it, whether teachers or pupils, do not disturb the continuity of existence of the school system as a *whole*. When this organized unit functions harmoniously in action, it also evokes that community of good feeling which is represented by such words as *esprit de corps* and high morale; failure to achieve this means a lowering of the feeling tone of the entire staff and a corresponding reduction in the efficiency of performance. To discover the stimuli which are morale-building, to apply them, and to prevent or to eliminate those which are morale-destroying are primary aims, if not the chief functions, of every administrative officer.

**Group unity as a professional end.** The achievement of the developmental goals of the school in the lives of its pupils imperatively

requires a solution to the common problem of disunity within the ranks of the educational workers themselves. The free and easy intercourse between personalities that a socialized democracy envisions is not to be reached so long as the school staff is divided by severe social barriers. A superintendent or principal who finds his teachers referring to him as " the powers that be " is obviously faced with the problem of reducing the social distance between him and them that is reflected in this phrase. This depersonalization or remoteness of the administrative functionary is a block to his effectiveness as a group leader which should be his normal role. If in addition to the instructor-administrator gap, similar barriers exist between each of these and the custodial employees, and such nonteaching officers as the attendance supervisors, then the centrifugal tendencies within the group have reached a dangerous level and counter- or centripetal forces must be set in motion to correct the disintegration that threatens and to restore some measure of the positive " we feeling " without which the staff cannot be happy.

The character of the relationship existing between the administrator and the teacher is as important for certain intangible school products as the pupil-teacher interaction. It is like the transmission of any force in which *A* affects *B* and *B* in turn influences *C*. The more nearly the relations between those in authority and those who are officially their " underlings " can approach a plane of personal equality, the healthier the result of the interaction will be for both. A sense of superiority in one person may be temporarily exhilarating, but is more than outweighed by the crippling effects of a sense of inferiority established in the behavior of the other. Elementary psychological insights of this kind are absolutely indispensable if the internal life of the school is to be free from the depressing atmosphere created by continuing the master-servant spirit in a setting where it is altogether out of place.

**Ascertaining community attitudes.** Most school officials would gain in their command of the local situation by taking periodic polls of public opinion concerning the school program. There are various

ways of doing this, but one simple procedure is to administer to the teachers and the parents an attitude blank of the type developed by Paul R. Mort, F. G. Cornell, and Norman H. Hinton, under the title of *What Should Our Schools Do?*[1] This measure contains 100 statements of this type:

(1) There is as much need for research to develop new methods in education as there is to develop new products in industry.
(2) Superintendents or principals should devote over half their time to helping teachers improve instruction.
(3) If properly qualified local teachers are available for vacancies in teaching positions, they should be given preference over out-of-town teachers.
(4) If schools are to educate children they must educate parents too.

A jury of competent specialists in this area agrees that a person who was willing to accept the implications of newer educational practices would respond to items (1), (2), and (4) by marking them "Agree," and to item (3) by marking it "Disagree." In their own survey studies of the adaptability of school systems to the changing needs of our time, Mort and Cornell made use of the following seven broad categories of questions:

1. Willingness to accept change in the local educational program and research or experimentation in various aspects of the local school situation.
2. Readiness to accept an intellectually tolerant point of view, one of freedom from personal bias or prejudice.
3. Approval of the general idea of extending the scope of educational services in the areas not now generally accepted within the common school or public school system.
4. Desire to broaden the curriculum or to take the school out of the classroom and into the community life, or vice versa.
5. Willingness to reject the theory of formal discipline or to accept the proposal of breaking down the *solid subjects*.

[1] Distributed through the Bureau of Publications, Teachers College, Columbia University, New York.

6. Acceptance of the policy of individualizing the educational resources of the school or acceptance of the primary policy of education of *personalities* as against desiring to have mass instruction.

7. Acceptance of possible related consequences involved in a program of liberalizing the educational program.

If the attitudes of teachers and parents (or local citizens generally) should contrast sharply with each other and if in turn the administrator finds his views in matters philosophical, sociological, psychological, etc., differing from either of these important interest groups, it is obvious that a period of mutual adjustment and self-education must intervene before the community gets the kind of school it deserves, wants, and is ready to have. Discussing the results of this "test" with these persons or their representatives in public gatherings and making clear why some mark an item "Agree" and others "Disagree" is an impressive form of adult education which every school official should experience at least once and preferably many times during his professional tenure.

## C. SCHOOL AND COMMUNITY CONNECTIONS

The last type of "social"-psychological problem which we wish to consider here is defined not in terms of the specific personnel involved, but in terms of the larger interrelations existing between two conceptual and existential wholes such as the school system and its supporting constituency. In the light of the theoretical position which has undergirded this volume at all important points, it seems necessary to view the school as a structural unit in a larger gestalt; *viz.*, the community itself. The former is projected against the latter, very much as a perceptual figure is seen against some enclosing ground. Under most circumstances, the "field" necessarily dominates that which lies within it, but this does not mean a unicursal relationship — on the contrary, the school system is almost always one of the points of high "potential" *within* a dynamic field, and significant forces affecting its surroundings undoubtedly emanate from it. The result is a certain stabilization of the energy or activity level of the entire

area represented by the fact that a "good" (or bad) school system commonly goes with a "good" (or bad) community and vice versa. These interconnections appear in the finding that the correlation between the average salary of high-school teachers (an imperfect index of the "goodness" of the school!) and the infant mortality in American cities is −0.69; literally this means that cities which pay their secondary-school instructors more than the average municipality have fewer of their babies die.

**The school as a social center of progressive stimulation.** The degree to which schools affect for the better their immediate surroundings must be determined anew in each special instance, but there is no question that extraordinary possibilities of this exist even though comparatively few may ever be realized. As one would expect, this influence is greater with some forms of organized education than with others. For example, it is undeniable that impressive changes in the farm practices of an agricultural community can be secured by the introduction of a department of vocational agriculture in the local high school. Note the data in Table XVII reporting certain

*Table XVII. A Comparison of Certain Significant Criteria of Four Kelley Community-farm Surveys, 1924 to 1929* *

| Criteria | Year of Survey | | | |
|---|---|---|---|---|
| | 1924 | 1925 | 1927 | 1929 |
| Number of farms surveyed | 65.0 | 44.0 | 40.0 | 99.0 |
| Bushels of corn per acre | 31.8 | 51.6 | 43.7 | 51.8 |
| Per cent tillable land in legumes | 6.4 | 7.3 | 11.8 | 17.7 |
| Pounds pork per sow | 726.0 | 937.0 | 915.0 | 1,012.4 |
| Per cent farmers selling livestock co-operatively | .... | .... | 43.0 | 45.4 |
| Per cent farmers selling dairy products co-operatively | .... | .... | 54.0 | 70.7 |

* C. L. Bunyard, Changed Practices Due to Vocational Agriculture, *Agricultural Education*, 1930, **3**, 19–32. — Kelley is a rural center in Iowa.

significant statistics following the establishment of such a school service. Even more convincing is the evidence that appears in comparing

farms personally reached by this instruction or where sons had attended the special high-school classes with those in which no direct aid from the school occurred. It should be noted in appraising these figures that even the "uninstructed" farm group is well above the average of the rest of the country in corn yield and legume acreage, indicating that the comparison is not vitiated by matching tutored farmers against "low-grade" tenants on rundown soil or properties. (See Table XVIII.)

*Table XVIII. A Comparison of Certain Significant Criteria of the 1929 Survey of the Farms of Instructed and Uninstructed Groups of Farmers in the Kelley Community* *

| Criteria | Uninstructed Group | Instructed Group | Superiority of Instructed Group |
|---|---|---|---|
| Number of farms surveyed. | 46 0 | 53.0 | .... |
| Bushels of corn per acre . . | 49.5 | 53.0 | 3.5 |
| Per cent tillable land in legumes | 15.5 | 20.9 | 5.4 |
| Pounds pork per sow. . | 867.0 | 1,101.0 | 234.0 |
| Per cent farmers selling livestock co-operatively. . . . | 28.2 | 60.0 | 31.8 |
| Per cent farmers selling dairy products co-operatively..... | 71.7 | 71.6 | — 0.1 |

* C L Bunyard, Changed Practices Due to Vocational Agriculture, *Agricultural Education*, 1930, 3, 19–32.

It may seem strange to document in this way the indisputable contribution that school instruction can make to the productive processes of the culture in which it occurs, but the common impression of academic inadequacy can be corrected in no other way. Behavior is not only *changed* under most classroom conditions, it is definitely *improved*. This result can be, and is being, achieved even where the curriculum is guided by such apparently different conceptions as:

1. A blueprint for a future social order, better than this.
2. A return to "first principles" and fundamental values.
3. A concern with the here and now in a pupil's life.
4. A concentration upon representative problem situations.

The standard of living that prevails in any locality is a function of many things, but the quality of the schooling that its inhabitants enjoy is one of the principal forces determining the goodness of daily life for them. By heightening the efficiency of the educative process through the techniques that characterize its multifarious research activities, educational psychology helps justify the ways of reason and assures to all learners a measure of happiness that they would not otherwise enjoy.

## SUMMARY

No picture of the ground embraced within the scope of educational psychology is complete without some reference, however brief, to those activities that fall outside the usual limits of classroom behavior. Problems of motivation, of learning, and of performance appraisal are not restricted to the internal life of the school, but appear in all social situations wherever educational interests are involved.

Conspicuous among these unconventional extensions of the psychological outlook is the vast field of adult education, for this is clearly foundational in all efforts at community betterment. The central theme of educational psychology, as this volume has repeatedly emphasized, is the improvement of the individual organism, but this broad task is not confined to preadult years nor independent of the allied aim of social reconstruction or improvement of group life. The possibility of adult learning is the biological basis upon which reforms in the behavior designated "citizenship" necessarily rest. Here we find that, except for a reduction in the speed of new acquisitions and the strong emotional resistances often operative in attitudinal changes, the modifiability of the adult organism after 40 is almost as great as in the years it devotes to formal elementary and secondary schooling. The ego structure of the mature person seems to be decisive in limiting the plasticity of various functions; thus, skills and knowledge that are relatively peripheral or marginal, *i.e.*, ego-distant, appear more flexible than those beliefs that in a sense constitute the

core of the personality. Such a central reorientation of total purposes as occurs in philosophic conversions, although occasionally compelled by the sharp shift in the real conditions of experience, necessarily encounters more severe obstacles than those arising in connection with subordinate sensorimotor processes.

A highly specialized professional phase of adult education (though commonly not seen in this light) appears in the search for the most fruitful types of relation between administrative officers and the teaching staff of a school system. The energies present in diverse radical, liberal, and conservative temperaments must all be harnessed into a "team" that will be more productive than any one taken singly. Teachers have needs just as pupils do, although they may be of an entirely different order. As in all group work, the different personalities who participate must defend and extend the values they cherish or symbolize while they also aim to further the values of others so long as these do not run counter to their own. When discussion reveals that these goods are in sharp conflict, the best way out of such impasses is to build a joint program on the basis of the values common to the contending parties and to hold the differentiating values in abeyance until time (rather, forces which operate through time) has narrowed the gap between them.

Finally, there is the large cluster of intricate problems centering about the give-and-take between the school as a social institution and the community in which it operates. When 54 per cent of youth leave school for economic reasons alone (according to the Maryland survey of the American Youth Commission), it is clear that the very personnel with which formal education is allowed to deal are regulated by major nonschool influences. That the work of the school is effective in changing community practices and local well-being is apparent as a general principle, but the actual large-scale behavior alterations that it induces must be demonstrated separately for each type of educational organization. It is this "growing edge" that now defines the expanding frontier of educational psychology.

## PROBLEMS FOR FURTHER STUDY AND DISCUSSION

1. Comment critically upon the view that psychology's and education's problems change as society's problems change. What is the nature of the part-whole relationship responsible for this situation?
2. Specify some of the conditions, internal and external, which make formal learning after work hours, such as night-school instruction, more than usually difficult for the older student. How can these barriers to self-improvement be reduced?
3. Are there certain distinctive methods of teaching adults other than those employed in handling children, adolescents, and youths? Which "schemes," for instance, will work successfully with mature learners and not with younger subjects, and *vice versa?*
4. What are some of the potential dangers inherent in any administrator's natural and legitimate interest in establishing "unity" among those subject to his jurisdiction? Distinguish between a plainly beneficial kind of professional "unity" and the more doubtful variety.
5. Effective clinical work involving a guidance counselor and his client has been repeatedly revealed to be dependent upon the "rapport" existing between the two personalities. What parallels do you see between this situation and the degree of mutual understanding between the school management and its patrons in the community?
6. List a few of the leading motives making for social, institutional, or behavioral change of any kind, and a corresponding set of motives apparently responsible for the resistance which most proposals for change usually encounter. What determines the relative strength of these forces? Which ones serve better as educational stimuli?
7. Are there any affinities between the basic problems of educational psychology and those of political psychology? Indicate some of them. Specify also whatever significant differences exist between these two areas of human conduct.

## *SUPPLEMENTARY BIBLIOGRAPHY*

The books included in the reference list below are designed to assist the reader who feels the need for more materials expanding the content of those pages which have aroused his personal interest. Only occasionally is a reference included which has been mentioned previously in either the body of the text or in the footnotes and questions; these, too, should be consulted by those eager to examine other sources. Each volume appears here mainly because of its representative treatment of the special topic with which it is concerned, a consideration that makes any pretense at exhaustiveness in these broad areas seem absurd. Many of these works necessarily touch upon other phases of educational psychology than those in which they appear to be especially helpful, but this should be stimulating rather than annoying to the reader who has abandoned the notion of sharp demarcation lines in matters of human behavior.

GENERAL (dealing with the topic of educational psychology as a whole)


1. Thorndike, Edward L. *Educational Psychology* (3 vols.). Teachers College, Columbia University, New York, 1913–14. — Important historically as the first "organization" of a new field. Still good reading.
2. Monroe, Walter S. (editor), *Encyclopaedia of Educational Research*, The Macmillan Company, New York, 1941 — Introductory articles covering most pertinent headings. Specialists may find them too brief, but to the general student of education they are the most convenient "first aids."
3. Skinner, Charles E. (editor), *Readings in Educational Psychology*, Farrar & Rinehart, Inc., New York, 1937. — Chapter selections and introduction by different experts. Presents a good cross section of the subject as viewed by American scholars.
4. Murphy, Gardner, *Historical Introduction to Modern Psychology*, Harcourt, Brace and Company, Inc., New York, 1926. — No specialized history of educational psychology exists, although this would fill a serious gap in professional literature. Educational psychology is as old as experimental psychology, but unlike the latter, its development lacks a recorder. Murphy's chapters on the rise of those movements which have meant most to educational psychology are the best available substitute.

5. Ragsdale, Clarence, *Modern Psychologies and Education*, The Macmillan Company, New York, 1932. — Traces effectively the important influences and consequences of certain major viewpoints on matters affecting the life of the school.
6. Watson, Goodwin, and Ralph Spence, *Educational Problems for Psychological Study*, The Macmillan Company, New York, 1930. — A delightful little book, built on the case-study principle and *practical* in the highest degree. Recommended for those who are disposed to find the issues of educational psychology "dry" and "too theoretical."

CHAPTER 1

1. Allport, G. W., *Personality — A Psychological Interpretation*, Henry Holt, Inc., New York, 1937. — The entire volume is strongly recommended, but Chaps. IV and V are most pertinent to the present classification.
2. Berne, E. V. C., *An Investigation of the Wants of Seven Children*, University of Iowa Studies in Child Welfare, Vol IV, No. 2, 1929. — Illustrative of long-continued and detailed observational procedures.
3. Cattell, R. B., J. Cohen, and R. M. W. Travers (editors), *Human Affairs*, Macmillan & Company, Ltd., London, 1937. — Chapter III on "Psychological Needs," by D. Katz, is short but stimulating.
4. Hartmann, G. W., "Interests, Attitudes, and Ideals," Chap. IV in *Educational Psychology* (edited by C. E. Skinner), Prentice-Hall, Inc., New York, 1936 and later printings. — An easy introduction to some complex territory.
5. Hollingworth, H. L., *Educational Psychology*, D. Appleton-Century Co., Inc., New York, 1933. Chaps. IV and V.
6. Murphy, G., L. B. Murphy, and T. M. Newcomb, *Experimental Social Psychology*, Harper & Brothers, New York, 1937. — Especially Parts II and III.
7. Thorndike, E. L., *Psychology of Wants, Interests, and Attitudes*, D. Appleton-Century Co., Inc., New York, 1935. — A superior example of the power of the oft-despised "paper-and-pencil" tests to advance our understanding of difficult issues.

CHAPTER 2

1. Bowden, A. O., and I. R. Melbo, *Social Psychology of Education*, McGraw-Hill Book Company, Inc., New York, 1937. — Chapter IX.
2. Cooperative Study of Secondary School Standards, *Evaluative Criteria* and *How to Evaluate a Secondary School*, Washington, D. C. — Two technical monographs, not suitable for beginners in the profession but representative of one influential approach to the large question of "evaluation."
3. Kilpatrick, W. H. (editor), *The Teacher and Society*, D. Appleton-Century Co., Inc., New York, 1937. — This is the First Yearbook of the John Dewey Society for the Study of Education and Culture.
4. Köhler, W., *The Place of Value in a World of Facts*, Liveright Publishing Corporation, New York, 1938. — Chapter I is a good introduction to the general problem.

5. Stagner, R., *Psychology of Personality*, McGraw-Hill Book Company, Inc., New York, 193-. — Chapters X and XXIII.
6. Thouless, R. H., *General and Social Psychology*, University Tutorial Press, London, 193-. — A novel British treatment of a commonly neglected theme. See particularly Chaps. XVII, XIX, and XX.

## CHAPTER 3

1. Cannon, W. B., *The Wisdom of the Body*, W. W. Norton, Inc., New York, 1939. — The concept of homeostasis here presented is important.
2. Dawson, P. M., *The Physiology of Physical Education*, The Williams & Wilkins Company, Baltimore, 1935. — A novel and impressive book, although issued in disturbing "simplified" spelling. Part XI belongs to this section.
3. Eulenberg-Wiener, R. von, *Fearfully and Wonderfully Made*, The Macmillan Company, New York, 1938. — Chapters XXV to XXXII, inclusive.
4. Goodenough, Florence, *Developmental Psychology*, D. Appleton-Century Co., Inc., New York, 1934 — The first five chapters belong in this context.
5. Weiss, P., *Principles of Development*, Henry Holt & Company, Inc., New York, 1939. — A difficult advanced text, but rich in suggestions.

## CHAPTER 4

1. Garrett, H. E., *Great Experiments in Psychology*, D. Appleton-Century Company, Inc., New York, 1930. — Of the fourteen "great" experiments selected by the author for extended analysis, at least seven are basic to a systematic educational psychology. See also the revised edition of 1941.
2. Gates, A. I., *Psychology for Students of Education*, The Macmillan Company, New York, 1930. — Chapter I outlines those aspects of psychology of most importance to the prospective teacher.
3. Lewin, K., *Dynamic Theory of Personality*, McGraw-Hill Book Company, Inc., New York, 1935; *Principles of Topological Psychology*, McGraw-Hill Book Company, Inc., New York, 1936; "The Conceptual Representation and Measurement of Psychological Forces," in *Contributions to Psychological Theory*, Vol. I, No. 4, Duke University Press, Durham, 1938. — All three works are basic.
4. Mursell, J. L., *The Psychology of Secondary School Teaching*, W. W. Norton & Company, Inc., New York, 1939. — Chapter I is outstanding in this connection.

## CHAPTER 5

1. Bews, J. W., *Life as a Whole*, Longmans, Green & Company, London, 1937. — Good in scope and conception.
2. Conklin, E. S., *Principles of Adolescent Psychology*, Henry Holt & Company, Inc., New York, 1935. — Questions many of the popular and even scientific notions about this period.
3. Curti, M. W., *Child Psychology*, Longmans, Green & Company, New York,

1938 (2nd ed.). — Scholarly enough to satisfy the critical pedant, and also invaluable to the thoughtful parent.

4. Dollard, J., *Criteria for the Life History*, Yale University Press, New Haven, 1935. — How to make technically adequate autobiographies.
5. Jersild, A. T., *Child Psychology*, Prentice-Hall, Inc., New York, 1940 (rev. ed.). — Probably the best of its kind.
6. Murchison, C. A. (editor), *Handbook of Child Psychology*, Clark University Press, Worcester, 1933 (2nd ed.). — An advanced symposium by many experts.
7. Pressey, S. L., J. Elliott Janney, and Raymond G. Kuhlen, *Life, A Psychological Survey*, Harper & Brothers, New York, 1939. — An interesting new departure in textbook writing.
8. Zachry, C., *Emotion and Conduct in Adolescence*, D. Appleton-Century Co., Inc., New York, 1940. — One of the Progressive Education Association's publications, designed to modernize classroom-guidance practices.

## CHAPTER 6

1. Bews, J. W., *Human Ecology*, Oxford University Press, London, 1935. — A pioneer effort to put genetics in its "proper" place as a key to explaining behavior.
2. Freeman, F. N., *Mental Tests*, Houghton Mifflin Company, Boston, 1939 (rev. ed.). — A standard reference work, eminently fair throughout.
3. Itard, J. M. G., *The Wild Boy of Aveyron*, translated by George Humphrey, D. Appleton-Century Co., Inc., New York, 1932. — An important document in the history of the nature-nurture controversy, brief and fascinating.
4. Kellogg, W. N. and L. A., *The Ape and the Child*, McGraw-Hill Book Company, Inc., New York, 1933. — A clever experiment comparing human and animal learning under "similar" external conditions. Not altogether flattering to the human!
5. Newman, H. H., F. N. Freeman, and K. J. Holzinger, *Twins, a Study of Heredity and Environment*, University of Chicago Press, Chicago, 1937. — A thorough and basic study. Note the concluding sentence on p. 362, "We feel in sympathy with Professor H. S. Jennings' dictum that what heredity can do environment can also do."
6. Prentice, C. S., *An Adopted Child Looks at Adoption*, D. Appleton-Century Co., Inc., New York, 1940. — Interesting and pertinent to the general problem of genes *vs.* training.
7. Spearman, C., *The Abilities of Man*, The Macmillan Company, New York, 1927. — Propounds his well-known two-factor ($g + s$) theory of intelligence which initiated the active factorial movement in contemporary American psychology. Intricate statistical analyses appear in spots.
8. Thorndike, E. L., Mental Discipline in High School Studies, *Journal of Educational Psychology*, 1924, 15, 1–22, 83–98. A Second Study of Mental Discipline in High-school Studies (with Cecil R. Broyler and Ella Woodyard), *Journal of Educational Psychology*, 1927, 18, 377–404. — These two ambitious and often cited investigations are significant because of their use of change

of score on an intelligence test as a measure of the amount of general transfer produced by certain school subjects. Such a device would be technically impossible if the level of intelligence is literally fixed and immovable, since the logic of the entire study rested upon the presumptive existence of differential gains in the intellectual capacity of pupils initially "alike" in this respect Increases, corrected for normal age gains, were usually small but positive.

9 Wheeler, R. H., *Science of Psychology*, The Thomas Y. Crowell Company, New York, 1940 (2nd ed.). — Chapters VI and VII offer an unorthodox but interesting approach to the question of "intelligent" behavior.

## CHAPTER 7

1. Doob, L., *The Plans of Men*, Yale University Press, New Haven, 1940. — Chapters I, II, VII, and XIII are of importance to the teacher who has been reared in the "lesson-plan" atmosphere.
2. Goldstein, K., *Human Nature in the Light of Psychopathology*, Harvard University Press, Cambridge, 1940 — The William James Lectures for 1937–1938; see particularly Chap. VI.
3 Horney, K., *New Ways in Psychoanalysis*, W. W. Norton & Company, Inc., New York, 1939 — A modernization of Freudism, much more acceptable in the light of experience than the original and unmodified versions of the founder and his close disciples.
4. Tolman, E. C., *Purposive Behavior in Animals and Men*, D. Appleton-Century Co., Inc., New York, 1931. — Heavy on the "rat" side of experimentation, but significant for its demonstration of "means-ends" activity.
5. Young, P. T., *Motivation of Behavior*, John Wiley & Sons, Inc., New York, 1936. — An exhaustive summary of "data."

## CHAPTER 8

1. Dollard, J., *et al.*, *Frustration and Aggression*, Yale University Press, New Haven, 1939. — Develops the thesis that "dominance" or fighting behavior is a reaction to the blocking of some impulse.
2. Guthrie, E. R., *Psychology of Human Conflict — The Clash of Motives within the Individual*, Harper & Brothers, New York, 1938. — Easy and graceful account.
3. Lund, F. H., *Emotions*, The Ronald Press Company, New York, 1939. — The last three chapters in the book are the best for an educator.
4. MacCurdy, J. T., *Psychology of Emotion, Morbid and Normal*, Harcourt, Brace & Company, Inc., New York, 1925. — Emphasizes the psychopathological with representative case histories.
5. Ruckmick, C. A., *Psychology of Feeling and Emotion*, McGraw-Hill Book Company, Inc., New York, 1936. — See Chaps. XVI, XVIII, and XIX.

## CHAPTER 9

1. Dewey, J., *Logic — The Theory of Inquiry*, Henry Holt & Company, Inc., New York, 1938. — A difficult work, but rewarding to the persistent reader.

This volume really supplants most of Dewey's earlier "How We Think" descriptions and recommendations which are now definitely out-dated, although constantly encountered in educational literature.

2. Hollingworth, H. L., *The Psychology of Thought*, D. Appleton-Century Co., Inc., New York, 1927. — An unusual but illuminating attack on this resistant area.
3. Judd, C., *Educational Psychology*, Houghton Mifflin Company, Boston, 1939. — Chapters XIV to XIX, inclusive, are among the best in this area.
4. Ogden, R. M., and F. S. Freeman, *Psychology and Education*, Harcourt, Brace & Company, Inc., New York, 1932. — Chapter XIV on "Thinking and Willing" is brief but good.
5. Symonds, P. M., *Education and the Psychology of Thinking*, McGraw-Hill Book Company, Inc., New York, 1936. — Admirable summary of the little we really know in this field.
6. Thouless, R. H., *How to Think Straight*, Simon & Schuster, Inc., New York, 1939. — Distinctly helpful to beginners.

CHAPTER 10

1. Bartlett, F. C., *Remembering, a Study in Experimental and Social Psychology*, Cambridge University Press, Cambridge, 1932. — An acute analysis of the reproductive process.
2. Book, W. F., *Economy and Technique of Learning*, D. C. Heath & Company, Boston, 1932. — Full of good hints and simple "rules."
3. Davis, R. A., *Psychology of Learning*, McGraw-Hill Book Company, Inc., New York, 1935. — Good comparative treatment.
4. Dunlap, Knight, *Habits, Their Making and Unmaking*, Liveright Publishing Corporation, New York, 1932. — A very *different* sort of book in this field, challenging all our accepted and conventional views.
5. Grabbe, P., and G. Murphy, *We Call It Human Nature*, Harper & Brothers, New York, 1939. — Delightful pictorial presentation of the essentials of psychology, itself illustrative of "easy" ways to learn and to remember.
6. Guthrie, E. R., *Psychology of Learning*, Harper & Brothers, New York, 1935. — A superior example of "atomistic" psychology at its best.
7. Hilgard, E. R., and D. G. Marquis, *Conditioning and Learning*, D. Appleton-Century Co., Inc., New York, 1940. — The latter half of this excellent survey is of most concern to educators.
8. Pear, T. H., *Remembering and Forgetting*, Methuen & Co., Ltd., London, 1922. — A detailed analysis of the processes of retention, more elaborate than the simple title suggests.
9. Thorndike, E. L., *Fundamentals of Learning*, Teachers College, Columbia University, New York, 1932. — The high-point of connectionist logic.

CHAPTER 11

1. Fletcher, J. M., *Psychology in Education — With Emphasis on Creative Thinking*, Doubleday, Doran & Company, Inc., New York, 1934. — One of the few books in this area to attempt to do justice to this theme.

2. Hartman, G., and A. Shumaker, *Creative Expression*, The John Day Company, New York, 1932. — Progressive education in its "arty" phase.
3. Mearns, Hughes, *Creative Youth: How a School Environment Set Free the Creative Spirit*, Doubleday, Page & Company, Garden City, 1925. — A Lincoln School classic by one of the "fathers" of this trend in progressive education.
4. Peterson, F., *Creative Re-education*, G. P. Putnam's Sons, New York, 1936. — Discusses "a kind of reconstruction of personality through seeking and discovering latent or dormant capacities." Differs from such volumes as "creative tap-dancing," although there is no reason for anyone to disparage this vigorous skill.
5. Spearman, C., *Creative Mind*, D. Appleton-Century Co., Inc., New York, 1931. — A distinguished British psychologist here gives his cleverly specialized endorsement of the pedagogy of originality. Brief and attractive.

CHAPTER 12

1. Allers, R., *Psychology of Character*, Sheed & Ward, Inc., New York, 1931. — Clear statement by a competent Catholic educational psychologist.
2. Chassell, C. F., *The Relation between Morality and Intellect*, Teachers College, Columbia University, New York, 1935 (Contributions to Education, No. 607). — A compendium of research data showing the positive correlation between intelligence level and ethical conduct.
3. McDougall, W., *Character and the Conduct of Life*, G. P. Putnam's Sons, New York, 1927. — How an eminent psychologist sought to deal with the problem of improving behavior along "ethical" lines.
4. May, M. A., and H. Hartshorne, *Studies in the Nature of Character*, The Macmillan Company, New York, 1928 and later. — Ingenious researches with much new material, but subject to serious reinterpretation on the theoretical side.
5. Piaget, J., *The Moral Judgment of the Child*, Harcourt, Brace & Company, Inc., New York, 1932. — One of the best in the series of the "Geneva" studies.
6. Roback, A. A., *Psychology of Character*, Harcourt, Brace & Company, Inc., New York, 1928. — A scholarly discussion of theories. Advocates his own theory of inhibitionism, *i.e.*, the position that character is essentially control of "lower" urges.
7. Slavson, S. R., *Character Education in a Democracy*, Association Press, New York, 1939. — Highly enlightening throughout.
8. Stern, W., *General Psychology from the Personalistic Standpoint*, The Macmillan Company, New York, 1938. — Chapter IV is very German, but contains an emphasis that is much needed in American educational psychology. The entire book, however, is very different from most texts that the ordinary student encounters.
9. Troth, D. C., *Selected Readings in Character Education*, The Beacon Press, Inc., Boston, 1930. — A good anthology of the older and standard literature.

## CHAPTER 13

1. Isaacs, S. S., *Social Development in Young Children*, George Routledge & Company, Ltd., London, 1933. — Critical nursery-school observations.
2. Kardiner, A., *The Individual and His Society*, Columbia University Press, New York, 1939. — A good piece of "applied" anthropology.
3. Leigh, R. D., *Group Leadership*, W. W. Norton & Company, Inc., New York, 1936. — Rules for a new kind of parliamentary procedure.
4. May, M. A., and L. W. Doob, *Competition and Cooperation*, Social Science Research Council, New York, 1938. — The first three chapters and the last should be examined.
5. Munn, N., *Psychological Development*, Houghton Mifflin Company, Boston, 1938. — An authoritative summary appears in Chap. XV.
6. Plant, J. S., *Personality and the Cultural Pattern*, Commonwealth Fund, New York, 1937. — Chapter XI deals with the school.

## CHAPTER 14

1. Brueckner, L. J., and E. O. Melby, *Diagnostic and Remedial Teaching*, Houghton Mifflin Company, Boston, 1931. — A much-used reference work.
2. Gates, A. I., *The Improvement of Reading*, The Macmillan Company, New York, 1935. — An expert analysis of the chief elementary-school "subject."
3. Pechstein, L. A., and F. Jenkins, *Psychology of the Kindergarten-Primary Child*, Houghton Mifflin Company, Boston, 1927. — Simple and specific.
4. Pyle, W. H., *The Psychology of the Common Branches*, Warwick & York, Baltimore, 1930. — Useful extracts from longer studies.
5. Reed, H., *Psychology of Elementary School Subjects*, Ginn and Company, Boston, 1938 (rev. ed.). — A clear introduction to the findings of research studies carried on within the conventional framework.
6. Tiegs, E. W., *The Management of Learning in the Elementary Schools*, Longmans, Green & Company, New York, 1937. — Plain and practical account.
7. Wheat, H. G., *The Psychology of the Elementary School*, Silver, Burdett & Company, New York, 1931. — Good treatment of research studies.

## CHAPTER 15

1. Butler, F., *Improvement of Teaching in Secondary Schools*, University of Chicago Press, Chicago, 1940. — A straightforward treatment and highly useful to the beginner, despite the fact that it is a bit conservative in tone.
2. Hawkes, H. E., E. F. Lindquist, C. R. Mann, *Construction and Use of Achievement Examinations*, Houghton Mifflin Company, Boston, 1936. — Probably the most convenient and least objectionable of the many guides to the "new-type" tests.
3. Jespersen, O., *Language: Its Nature, Development, and Origin*, Henry Holt & Company, Inc., New York, 1922. — An outstanding classic in the psychological approach to linguistic science. Apart from Book I, the rest of the

volume should not be too forbidding for anyone who has survived the reading of the present text

4. Koos, L. V., and G. Kefauver. *Guidance in Secondary Schools*. The Macmillan Company, New York, 1932. — One leading view of the way to do counseling.
5. Mursell, J. L., *The Psychology of Secondary School Teaching*. W. W. Norton & Company, Inc., New York, 1939. — Comprehensive discussion of the special subjects at this level of instruction.
6. Progressive Education Association, Commission on Secondary School Curriculum, *Science in General Education*. D. Appleton-Century Co., Inc., New York, 1938. — A comprehensive treatment, essentially in harmony with the outlook of the text.

## CHAPTER 16

1. Hartmann, G. W., Measuring Teaching Efficiency among College Instructors. *Archives of Psychology*, No. 154, 1933. — An attempt to assess competence in teaching by the amount and value of the changes produced in the pupils.
2. Lovejoy, C. E., *So You're Going to College*. Simon & Schuster, Inc., New York, 1940. — A bit breezy, but sound and informative in the main. Includes a popular college-rating guide.
3. McConn, C. M., *Planning for College and How to Make the Most of It While There*, Frederick A. Stokes Company, New York, 1937. — Good advice from a well-known dean of students.
4. National Society of College Teachers of Education, 27th Yearbook, *The Study of College Instruction*, University of Chicago Press, Chicago, 1939. — A symposium written by educators and psychologists for the use of their colleagues, most of whom politely decline to be influenced by this viewpoint
5. Reed, A. Y., *The Effective and the Ineffective College Teacher*. American Book Company, New York, 1935. — An exhaustive survey of associated factors.

## CHAPTER 17

1. Cantril, H., *The Invasion from Mars*, Princeton University Press, Princeton, 1940. — A challenge to those educators who wonder if learning and immunity to panic are related.
2. Cowdry, E. V. (editor), *Problems of Ageing*, Williams & Wilkins Company, Baltimore, 1939. — Chapter XX is by W. R. Miles on the psychological aspects of aging.
3. Curti, M., *Social Ideas of American Educators*. Charles Scribner's Sons, New York, 1935. — This is Vol. X of the Commission on the Social Studies of the American Historical Association. The entire volume is superior background material, but Chaps. XII to XVI are particularly appropriate to the current scene.
4. Hartmann, G. W., and T. Newcomb (editors), *Industrial Conflict, a Psychological Interpretation*, The Dryden Press, Inc., New York, 1940. — *Cf.* especially the illuminative chapter by A. W. Kornhauser on the psychological bases of class divisions.

5. Lynd, R. S. and H. M., *Middletown in Transition*, Harcourt, Brace & Company, Inc., New York, 1937. — A standard analysis of an American community and a model survey for the socially conscious educator.
6. Sherif, M., *Psychology of Social Norms*, Harper & Brothers, New York, 1936. — The laboratory section may be skipped but the entire brief volume is a jewel in the eyes of thoughtful educators.
7. Woelfel, N., *Molders of the American Mind*, Columbia University Press, New York, 1933. — A convincing demonstration of the power of educational leaders to reshape community life.

# GLOSSARY

The numbers following the explanation of the terms refer to the pages on which the word is defined or the idea which it signifies explained and illustrated.

The words which are listed below all occur in this volume at least once. The specialized or "technical" vocabulary of educational psychology is much greater than this small selection of terms. Some of these words are encountered almost exclusively in a restricted educational or psychological context; many of them are forms commonly used in "everyday life" whose meanings have been modified to fit the new concepts required by the subject as it has developed. For this second group, the "popular" meaning usually gives a fair approximation to that intended in the text, but the "professional" meaning — or, in some instances, the peculiar significance intended by the writer — is given more precisely in the present arrangement.

Perhaps the reader should be warned that exaggerated concern with vocabulary per se may make simple matters hard. Wherever possible, convert the difficult word into a concrete picture or substitute some nonverbal symbol for the reality it designates. These may help in keeping one's feet on the ground when dealing with unfamiliar abstractions.

**anabolism,** that phase of metabolism or body chemistry which involves the synthesis or building up of living tissues.

**atomism,** the "atomic" approach to nature holds that the ultimate reality is found by breaking every experience into its tiniest bits. This technique is challenged by those who hold that there are "molar," *i.e.*, larger and more extended, entities, whose existence eludes us if we use elementaristic analysis only.

**autonomic nervous system,** the phylogenetically older "nerve-net" sector of the total nervous system consisting of widely distributed clusters of cells for controlling smooth muscles and glands, chiefly within the torso.

**autonomy, functional,** pertains to a theory of motivation by which a primitive or original drive exhausts itself in certain actions, which acts in turn serve to motivate themselves or to motivate other behavior without any connection necessarily existing between them and the initial urge other than a historic link. (214)

**axial,** refers to the spinal "axis" or any other major reference region of the body.

**axiology,** the special science of valuation and its laws.

**battery** (of tests), a group or combination of tests, so chosen as to have higher predictive value than any one component taken alone or than any other similar "team."

**behaviorist** (**-ism**), an adherent of that system of psychology which excludes consciousness as an object of study. There are orthodox and liberal behaviorists who differ in the completeness with which they reject consideration of the "inner life" of the subject, but all characteristically stress the use of objective or physical techniques in investigating conduct.

**biosocial**, refers to such social relations as are conditioned mainly by biological factors.

**calibration**, the scaling or grading of a test usually by converting the full range of scores into equivalents of some standard measure.

**caudal**, pertaining to the tail or the rear end of the organism.

**cauterize** (**-ization**), a surgical or operative method of burning or searing tissue with a hot instrument.

**cephalic**, pertaining to the head or "forward" end of the body.

**chromosome**, the small body found in the germ nucleus during cell division which carries the **genes**.

**closure**, the dynamic process whereby incomplete systems achieve completion and final stability. Closure occurs on the physical, neurological, and psychological levels. (201)

**cognition**, the "knowing" processes of the mind, including perception, learning, memory, thought, and all nonemotional and nonimpulsive phases of behavior.

**configuration** (**-ism**), the complex stimulus structure that underlies all perception and every other feature of our experience. A square is a visual configuration; a melody is an auditory configuration; a muscular movement is a kinesthetic configuration, etc. Configurations are systems of energy which interact as "wholes" with other totals.

**connectionism**, a psychological system perfected by E. L. Thorndike which claims that all mental processes rest upon native or acquired *connections* between situations and responses. Methodologically, it is a twentieth-century version of historic associationism. (314)

**correlation**, any dependent, associated, or concomitant variation among measurable quantities. Different mathematical coefficients (ranging from $-1.00$ to $+1.00$ or from 0 to $+1.00$, depending upon the nature of the data and the method of computation) express the degree to which this covariant tendency exists between two sets of paired values.

**cortex**, literally, the "bark" or outer layer of any stratified bodily organ. Unless otherwise specified, *the* cortex usually means the *cerebral* cortex, *i.e.*, the top rind or gray matter of the hemispheres of the brain.

**dialectical**, pertaining to a deductive system of reasoning or logic. Chiefly concerned with elaborating the meaning of concepts and hence common in verbal controversy.

**didactic**, pertaining to deliberate instruction or exhortation.

**differentiation**, the progressive change of a relatively homogeneous field (or body) into one more heterogeneously structured. (48)

**dogma (-tism)**, a claim or position maintained by vigorous assertion, but not resting upon evidence persuasive to others. (105)

**dominance**, a trait in an individual which leads him to seek control of others and to push his own objectives in a social situation.

**drives**, conditions within the organism which provide the energy for our behavior in specific directions See also **need** and **want**.

**dualism**, any world view which stresses the "two-ness" or double character of experience. Usually, it refers to the belief that the mental and physical worlds are two utterly different divisions of the final reality. (44)

**dynamic**, refers to any change, motion, or application of force; frequently restricted to problems of motivation. In gestalt psychology, the word implies the activity of energy fields resulting from differentials and ending in some sort of "balance."

**eclectic (-ism)**, a person who builds his theories and practices on the basis of selecting what seems to be the "best" in other systems of thought and action without regard to the systematic character of the product thus constructed. His criterion of what is best, or his general principle of selection, fluctuates sharply. (5)

**ecology**, a biological discipline concerned with the relation of organisms to their inorganic and organic environments.

**education**, development in ability, character, knowledge, and skill by experience, study, teaching, or training. There are innumerable interesting definitions of this large term, but one of the best is from the Quaker educator, Rufus Jones (*Preface to Christian Faith in a New Age*, The Macmillan Company, New York, 1932, p. 183): "Genuine education does not present to minds, young or old, some ready-made conclusion. It trains minds to face complex situations, it increases their capacity to think them through, to organize the facts involved, to *find* their laws and principles, to arrive freely and solely under the compulsion of the facts, to the conclusion that fits all the data that are there." But even this fails to touch all the aspects of personality and society with which education is necessarily concerned. (Preface)

**educational psychology**, an applied science concerned with the techniques for directing human conduct along better channels. More narrowly, that phase of psychology devoted to those questions of teaching and learning which arise in connection with the operation of schools. (Preface)

**eduction**, Spearman's term for the mental process of producing new cognitive content on the basis of already perceived qualities or relations. (278)

**ego**, the self, or the individual's notion of himself.

In *Freudism*, that assertive portion of the personality which grows out of the **id** and whose function it is to accommodate the impulses emanating from the id to the requirements of external reality.

**egocentrism**, a tendency to refer every happening to the self; to take things "personally."

**embryo**, a living creature in its beginning stages of development. In man the term is properly applied only to the first two months following conception.

**empirical**, refers to knowledge that rests upon observation as contrasted with non-experiential sources of evidence. Not to be confused with "experimental."

**environment**, that larger "half" of all experience which is distinguished from the organism itself.

**erotic**, pertaining to sexual interest or excitement.

**essentialism**, a school of educational thought championed by Bagley and Kandel of Teachers College. Its chief tenet is opposition to the tendency to eliminate "subjects" (like arithmetic, grammar, etc.) from the school curriculum as favored and practiced by some "progressives."

**etymologist**, an expert in the derivation of words.

**eugenics**, the art and science of improving the hereditary quality of those who are born. (163)

**eupathics**, the science of the conditions of human happiness.

**euthenics**, the art and science of improving the environmental conditions under which a person grows to maturity; particularly, the betterment of social and educational circumstances throughout life. (163)

**faculty psychology**, an out-dated school of psychology resting upon a classification of mental processes into powers or faculties, which were then considered explanatory principles for the facts assigned to them. Most of the chapter headings and much of the terminology of elementary psychology today bear traces of its influence. (310)

**feeble-minded**, a person noticeably deficient in adaptive capacity. Since the introduction of the Binet scale it has been customary to define degrees of feeble-mindedness in terms of IQ intervals, *e.g.*, 50–75 roughly defines the moron range, 25–50 the imbecile, and below 25, the idiot. There is no sharp line of distinction between any of these or between the high-grade moron and the "dull normal." Some "test" morons are almost certainly normals who developed under severe cultural deprivation.

**fetus** (or **foetus**), an embryo in its later period of intra-uterine growth; applied to the unborn human after the second month of development.

**field**, in psychology, this term refers to the region of forces surrounding any perceptual object. In physics, Faraday insisted (and proved) that the field about an electromagnet is as real as that "body" itself. By derivation, therefore, contemporary psychology conceives of behavioral phenomena as concomitantly establishing extended fields around themselves and in turn being influenced by remoter fields. The "intangibility" of psychological fields is usually greater than that of physical fields since the factors governing a mental event often lie deep in some (hitherto) inaccessible biological conditions. But they are both "objective" realities.

**formal discipline**, the study of some subject less for its own sake than for the practice it indirectly affords in other fields; also the view that certain school topics or subjects concomitantly developed important personality traits to a higher degree than others. Educators have generally repudiated this both in theory and in practice, but the concept was not wholly false. (311)

**frustration**, the act of blocking an organism's desires.

**fundament** (-s), the mental elements between which a relation obtains.

**fundamentalist**, any one who accepts the literal language of the Bible as an adequate guide to thought and conduct in our day.

**Gaussian curve**, another name for the normal curve of distribution, so named because of the contribution to the related theory of probability made by the German mathematician Gauss.

**genes**, microscopic factors located in the chromosomes of the germ plasm which are primarily responsible for the appearance of a bodily character in the mature organism.

**genetic**, pertaining to growth or development in either the individual or the race. Essentially a chronological or historical concept.

**genius**, exceptionally high mental ability, especially that which manifests itself in original creations esteemed by the social group. Superior capacity or "great" productions that are never recognized as such do not constitute genius, which is a cultural rather than a simple biological phenomenon.

**genotypical**, referring to the common underlying principle that unites diverse phenomena; explanatory rather than descriptive.

**gestalt**, the original German for any experienced whole, configuration, structure, and other more or less synonymous terms. Gestalt theory (with a capital G) refers to that variety of field or organismic psychology which considers the properties of gestalten (lower case g) basic to any explanation of behavior.

**gradient**, a gradual slope of energy or any other magnitude, distinguished by smooth and regular transitions from relatively large to small amounts, as contrasted with uniform or irregularly variable quantities.

**guidance**, a name given to all devices, formal and informal, which are designed to prevent personality maladjustments or to facilitate their cure. It embraces mental hygiene, educational and vocational supervision, assistance in forming one's religious, political, and occupational attitudes, and all other "intimate" efforts to help the individual grow into his culture. Whenever the pupil calls upon others for aid in making his adaptations, guidance is called into play. (10)

**halo error**, a tendency to be influenced in the direction of increasing one's impression of a person's relative standing in some particular respect as a result of an exceptionally favorable *general* estimate or a high opinion of some other special trait.

**hedonic**, pleasurable or unpleasurable feeling tone, generally the former.

**hierarchy**, any order of eminence or superiority, literal or figurative.

**hormism**, a psychological system developed by the late William McDougall which made striving and purposing the cardinal features of behavior.

**humanist**, a term of many diverse meanings, but usually implying anyone who makes man and his needs or aspirations central in his thinking rather than such alternatives as God or the physical universe. In the history of education, a humanist has generally been an advocate of emphasis upon literary and artistic "classics," often in a severely traditional manner, a tendency which has paradoxically bordered upon the inhumane because of its blindness to individual differences. In the broader social sense, a humanist is a humanitarian.

**IQ**, the intelligence quotient, which is simply the *ratio* of a person's tested intelligence score to the normal or typical intelligence of his age. The most widely used of these ratios is the one in which mental age is divided by chronological age, or, $IQ = \frac{MA}{CA} \times 100$. (157)

**id**, in Freudian psychology, the impersonal part of the mind, the seat of the unconscious, and the source of all the instinctive urges.

**ideational**, pertaining to ideas, concepts, meanings, thought content, etc.

**inhibited**, a condition of being blocked or arrested so that certain modes of expression are checked.

**insight**, this may be both product and process. If the former, it refers to the novel *result* or outcome of some neural reorganization; if the latter, it refers to the *way* in which new mental or behavioral structures arise.

A form of adaptive response in which the appropriateness of what one does is seen to follow directly and necessarily from the requirements of the situation or problem. There are many alternative definitions which emphasize different aspects of the process of reorganizing experience to achieve some purpose. (150)

**integration**, the process by which any content is organized into units of a higher order than those with which one originally began. Usually the "parts" change their character after the formation of this larger "whole."

**intelligence**, a loose psychological concept, best construed as the ability of the organism to meet a new situation with satisfaction to itself and others. (147, 149, 182–183)

**introspection**, critical self-observation and description of direct experiences, originally used only by trained psychologists upon themselves.

**intuition**, an immediate type of perception appearing in difficult and obscure circumstances and providing adequate preliminary guidance to the person. (359)

**katabolism**, the opposite of **anabolism**, involving a tearing down of the components of the living organism.

**kinesthetic**, pertaining to muscle, joint, or tendon sensations. (52)

**leitmotiv**, German for "leading conception" or dominating pattern. Originally applied to Wagnerian music, but by derivation and analogy used in describing the central purpose of an individual's life as seen by him or by others.

**lesion**, any pathological disturbance in any part of the body.

**limen**, often called the "threshold," *i.e.*, the point in a stimulus scale where the sensory experience undergoes a perceptible change.

**materialism**, a world view which maintains that "matter," regardless of the changing ways in which physical science may interpret this "substance," is the basic reality out of which everything is composed.

**matrix**, the setting in which something happens.

**maturation**, the process of arriving at full development; essentially a synonym for growth approaching its normal end.

**mean**, an arithmetic average determined by adding the separate quantities in a

series and dividing this sum by the total frequency of their occurrence. It is the commonest of all measures of central tendency.

**median**, the numerical midpoint in a series of quantities when these are arranged in the order of size.

**mensuration**, the process of measuring.

**mental age**, the amount of mental development a person exhibits when compared to that found in an average individual of equal chronological age. The mental ages of most children (about two thirds) correspond very closely to their chronological ages, about one sixth fall below their calendar age and another sixth above — a result to be expected on the basis of the properties of the normal probability curve for human traits.

**metabolic**, pertaining to the biochemical processes of absorption and elimination or the pace at which the body uses up energy.

**methodology**, the logic of scientific research in general or some special technique.

**modal**, referring to the "mode" or most frequently occurring item in a series.

**morphological**, anything pertaining to structure, shape, or design. (48)

**motivation**, the process by which the factors producing an individual's conduct operate.

**nativist**, in science, any thinker who emphasizes the innate or inherited features of knowledge or behavior.

**naturalism**, the point of view of most modern scientists. It holds that all natural phenomena can be fully explained by reference to other natural forces and that there is no need to refer to any reality or power "beyond" this natural order. (44)

**need**, a condition of the human body which determines seeking behavior. (15)

**neonate**, the new-born human organism.

**neoscholasticism**, a name applied since the late 'eighties to a modernized version of medieval metaphysical thought. (45)

**neural**, anything involving a nerve or a system of nerves.

**neurone**, an anatomical unit, composed of the cell body of a nerve and its projections (axones and dendrites). (59)

**neurosis (-otic)**, a minor nervous disorder or any recognizable psychopathic tendency; a person so affected.

**norms**, any standard or representative scores for a given population or type, usually stated in terms of average performance.

**objectivity**, an ambiguous term supposed to denote the absence of subjective or personal bias, although all experience is necessarily "colored" by the properties of the experiencer. Science aims to be objective by relying upon independent verification by other investigators.

**ocular**, pertaining to the eye.

**operation (-al, -ism)**, operationism is a later form of behaviorism which holds that all scientific concepts are ultimately defined by the "operations," actions, measurements, and specific performances made by the scientist in his work. The meaning of any idea is operationally equivalent to what the person who uses it *does* with it. (106)

**organism,** any distinguishable living creature viewed as an interdependent system of organs, tissues, and cells. (44)

**organismic,** pertaining to the organism or having its principal properties of coherence, self-regulation, interdependence, and other phenomena found only in living systems. (46)

**paleontology,** the science of extinct animals or fossil remains.

**pathological,** pertaining to disease or any other departure from the normal or healthy.

**pedagogy,** a rough synonym for "education" as a subject, but usually less inclusive in meaning, referring specifically to the more professionalized practices of teachers. (Preface)

**percentile,** that point in a series of quantities below which falls that percentage of a given group indicated by the specific number or percentile. Thus, the 30th percentile is that point below which 30 per cent of the group fall and above which the remaining 70 per cent lie. A percentile may also be one of those proportionate "hundredths" which represents the single whole "step" from the 48th to the 49th percentile.

**percept,** whatever is perceived during the process of reacting to any stimulus.

**peripheral,** whatever is marginal or superficial rather than central or fundamental.

**personality,** technically, this is best viewed as the distinctive field property of an individual organism. The integrated organization of our total behavior pattern is responsible for the phenomena of personality. (381)

**phenotypical,** pertaining to the specific overt phenomenon; descriptive rather than explanatory.

**pluralism,** the theory that ultimate reality contains more than one final entity, that difference rather than unity is inherent in nature. Opposed to both monism (the viewpoint of this text) and dualism, although its affinities are more with the latter.

**polarity,** a form of relation between objects or ideas wherein "oppositeness" is the primary attribute.

**prestige,** the relative repute or standing enjoyed by an individual, group, activity, institution, etc., in the eyes of the median member of the community. It is one of the most important terms in social psychology as it accompanies all stratification in society.

**probable error,** a measure of stability of some obtained measure which reveals the limits within which the obtained value will occur 50 per cent of the time. Thus, if an empirical mean score of $18.42 \pm 3.18$ is reported on the basis of a certain sample, this indicates that the "true" mean score will fall between 15.24 and 21.60 if an "infinite" number of repetitions is made.

**profile,** a schematic outline of a person's mental traits presented in graphic form on the basis of some quantitative determination. (34)

**progressive education,** a phrase incapable of brief characterization. It is a twentieth-century *world* movement in pedagogy. Leading attributes are: A democratic social philosophy, concern for the total development of the individual child, experimentation with the form and content of schooling, opposition to traditional practices that seem to limit personal freedom and growth, use of the school as an instrument of community reconstruction. It undoubtedly repre-

sents the "growing edge" or frontier of contemporary education, but suffers from some "wild" practices and some still wilder advocates.

**psychic,** a synonym for "mental" (as distinct from physical) and neither more nor less mysterious than it.

**psychoanalysis,** a system of psychology originated by Sigmund Freud, a Viennese specialist in mental and nervous diseases, and developed by many European and American disciples. It places special stress upon the unconscious, repression mechanisms, ramifications of the sex drive, etc., and has its widest application in the treatment of behavior abnormalities.

**psychology,** a branch of knowledge which seeks to understand why we act, feel, and think as we do.

**psychometric,** pertaining to the quantitative features of psychological investigations.

**psychotic,** pertaining to psychosis, a severe pathological mental condition.

**pubescent,** characterizing a young human being who is passing through the initial and more obvious physiological phases of adolescence.

**purposive,** pertaining to any determinant of response found not in the character of the stimulus but in the history and ends of the organism.

**r,** a symbol for coefficient of **correlation.**

**rapport,** a name derived from hypnotic usage referring to the intimacy of "mental" contact between two personalities. Friendship, for instance, involves close or "good" rapport; hate implies its absence. (126)

**rationalization,** intellectual defense of a position inherently devoid of rationality. Paradoxically, it may also refer to the orderly explanation of a mass of data. These contrasted "good" and "bad" meanings should be sharply segregated.

**reaction time,** the time elapsing between the application of any sensory stimulus and some reflex or learned response on the part of the subject.

**regression,** an apparent tendency on the part of individual organisms, animal species, and human societies to revert to their mean or typical form instead of progressing uninterruptedly. The statistical or specialized text usage is derived from this earlier and more general concept.

**reliability,** the self-consistency of any measuring device.

**S.D., sigma,** the standard deviation, generally symbolized by the Greek letter $\sigma$, is a measure of dispersion computed by finding the square root of the mean of the squares of all the separate score deviations from their own mean.

**sampling,** the selection, preferably at "random," of a restricted number of cases from a larger "population," on the assumption that this smaller group will be a faithful representation of the whole.

**schema,** any model or framework for the orderly presentation of data.

**science, unity of,** an organized effort begun by European scholars under the leadership of Otto Neurath and continued in the United States, notably at the University of Chicago, to restore the original "oneness" of all rational attempts to explain the world. Necessarily it emphasizes the interrelationships and likenesses in both method and content of the various specialized fields of research.

**semantics,** originally the philological science of word meanings, but recently generalized by Alfred Korzybski to include all the intricate processes of human

thought and communication. It is non-Aristotelian in logic and represents an effort to get closer to reality than the traditional language of either scholarship or daily life permits.

**sensorimotor,** any neural activity in which both incoming and outgoing processes are simultaneously conspicuous.

**skepticism,** a world view in which doubt or disbelief concerning the absolute or final truth of any experience is prominent. Sometimes it refers to the tendency to be hesitant or tentative in the acceptance of any assertion. (105)

**social psychology,** a borderline science devoted to studying the reciprocal influence of the individual and the group. It usually stresses those aspects of personal experience and conduct determined by membership in social organizations. There are other similar ways of describing this subject such as indicated by the title of the Society for the Psychological Study of Social Issues.

**social stratification,** describes the fact that all existing societies are "class" societies, *i.e.*, contain recognizable subgroups with varying functions, privileges, rewards, differences in prestige, etc. The social "pyramid" is assumed to have "layers" akin to those revealed by geology.

**socialization,** the way in which the young develop preferred modes of behavior and acquire the ability to live as members of a group.

**standardization,** the process of establishing uniform procedures for administering tests, together with the preparation of accompanying interpretative norms.

**status,** the relative standing or position a person or group occupies in the life of the community.

**subjective,** an inexact concept, referring generally to phenomena that are primarily dependent for their "existence" upon the state of the observing organism and less upon the physical stimulation of the outer world.

**summum bonum,** Latin for the "greatest good," *i.e.*, the highest or largest value one knows or accepts as valid for oneself.

**superego,** basically, a person's social conscience, conceived by Freud as checking the **ego** whenever it is disposed to give free rein to the "lower" impulses coming from the **id.**

**sympathetic nervous system,** a group of ganglia or cell colonies located outside the spinal cord at the lower chest and abdominal levels which regulate certain digestive, secretory, and reproductive processes.

**systematist,** originally, a scholar in any science, notably biology, who is primarily concerned with problems of classification. Now any theorist who holds that the laws and principles of "functional interdependence" are more significant than a miscellany of unrelated facts. (5)

**tachistoscope,** any exposure apparatus which permits no more than a brief glimpse of the thing exposed.

**teleology,** the point of view that the events in nature (and specifically in human nature) are directed toward some goal or end, and that the nature of this aim influences the observed course of action.

**thalamus,** a central mass of gray matter located at the base of the cerebrum and containing the terminals of afferent or "sensory" nerve fibers; consequently, considered to be a center of feeling and emotion (supported by clinical evidence).

**theism**, any religious outlook which affirms the existence of a *personal* God. The attributes of this Deity differ with different theists.

**Thomism**, the philosophic orientation of St. Thomas Aquinas, great theorist of the Middle Ages and "official" systematist of Catholic doctrine in religious, social, and scientific matters. A Thomist is anyone who follows in this tradition with little modification of the original. (45)

**topology**, a branch of higher mathematics (geometry) concerned with those properties of a figure which remain constant despite all deformation other than "tearing" (*i.e.*, disintegration) or absorption into another figure. The application to psychology seems metaphorical but is intended to be literal since the personality of man and these structures are in some ways similar. (124, 217)

**trait**, in personality description, any relatively permanent and distinctive mode of behavior; in psychology generally, any identifiable attribute of the organism. (387)

**transcendental**, the essential attribute of any system of thought which holds that it is necessary to "transcend" the Nature revealed to us by physics, biology, and psychology before it can be fully understood. The supernatural (or supranatural) is implied in this view. (45)

**transfer of training**, as a *problem* and as a *fact*, this phrase refers to the improvement of a performance occasioned by the mastery of some kindred function, but without any direct training of the other performance per se. *How* this occurs is a major theoretical issue.

**trauma**, any shock, wound, or injury which disturbs the free functioning of the personality.

**valence**, in Lewin's topology, this term signifies the attracting and repelling character of any stimulus situation. See also **vector**. (219)

**validity**, in statistics, this refers to the fact that a test (or score) correctly measures that which it reputedly quantifies. *Degrees* of validity are usually gauged by some form of correlation index.

**value**, any object of desire, or, more broadly, any natural phenomenon (event, object, quality) capable of producing a condition of satisfaction in the human organism. We value whenever an estimate of worth is made.

**vascular**, refers to the blood vessels or any similar anatomical system.

**vector**, in topological psychology, this refers to the directed lines of force which obtain between an organism and some object or activity whenever the organism is drawn toward it or repelled thereby; hence, like **valence** it may be either positive or negative. (219)

**vestibular**, pertaining to the auditory-cerebral structures and nerve paths involved in maintaining our postural adjustments.

**want**, an impulse based upon an effort to alleviate some organic or organismic type of deprivation. (16)

**Weltanschauung**, German for "world view." A way of apprehending experience or perceiving reality.

**Weltschmerz**, German for "world pain," *i.e.*, a hypersensitive intellectual and emotional condition in which all the burden of the earth's woe is borne by the individual. (422)

**will**, the total self in action; best displayed in conscious acts of choice and similar decisions. (216)

# INDEX

*n* after a page number refers to material in a footnote.


Ability, application, 263
  drive and, 189–192
  of prospective teacher, 497–499
  *See also* Intelligence; Learning.
Abstract(s) in professional psychology, 107–109
Abstractions, intelligence and, 166–167
Achievement, intelligence and, 151, 168, 188
Activity, creative, 347–375
  education in, 463–466
Adaptation, learning and, 285
Adient behavior, 15
Administration, psychological factors in, 507–511
Adolescence, characteristics of, 90–93
  ego responses in, 91–93
  height in, influence of, 14
  heroism in, 255
  maladjustment in, 91–93
  religion and, 92*n*
  strains of, illustrated in Pasteur, 98
Adoption, effects of, 177
Adulthood, characteristics of, 94–96
  goals in, 203–205
  learning in, 504–507
  values in, 95–96
Affection, authority through, 11. *See also* Emotions.
Age, classification of, 72–74
  education, factors in, 504
  old–, 96–97
Allport, G. W., 29*n*, 214–215, 314–316, 387
Allport-Vernon Scale of Values, 31, 32, 235
American Psychological Association, 229
American Youth Commission, 93
Analogies, uses of, 365–366
Analysis, artistic, 370
  of authority, 10–12
Anderson, L. D., 174
Anger, fatigue and, 242
  fear distinguished from, 226
  frustration and, 241–243
  regulation of, 241–243
  as typical emotion, 225
Anxiety, culture and, 237. *See also* Fear.
Application ability, 263
Aquinas, St. Thomas, 45*n*
Arithmetic, differentiation in, 450–451
  instruction of, 449–454
Artificial insemination, 165*n*–166*n*
Artist-learners, artist-teachers, 350
Artistic analysis, 370
Assumptions, role of, 353
Attitude(s), 388–399
  child's, value in school, 14
  community's, 509–511
  cynicism as, 388
  experts and, 392–393
  farmers', 411
  formation of, 391–395
  modification of, 142–143, 153–154
  rigidity of, 506–507
  scientific, 468
  social, 142
  suggestion and, 393–394
  teachers', 4, 213, 395–399
Authority, analysis of, 10–12
  autonomy *vs.*, 10–12
  experts as source of, 12
  types of, 11–12
Autocratic atmospheres, 414–417
Autonomy in personal behavior, 10–12
Aversions, list of, 205–206
Awareness, motivation and, 162–163
  need as, 16

Background for educational-psychology study, 3
Bagley, W. C., 316–317

Bargaining behavior, 419
Barriers, 128–129
Batson, W. H., 307–308
Beery, G. S., 112–115
Before-and-after as investigation technique, 299
Behavior, adient, 15
  autonomy in, 10–12
  bargaining, 419
  co-operative, 410–411, 418–420
  criteria of, 251–252
  development of, 66–97
  emotional, 225–256
  expressive, 55–57
  goal, 130–134
  infant, 74–81, 82–83
  intelligent, 145–194
  manipulative, 82–87
  modifiability of, 153–194
  orientational, 460–462
  preschool, 81–87
  sacrificial, 253
  sexual, 244–250
  social, 409–430
  time table of, 85–87
  trial-and-error, 294–298
Beliefs, as learning products, 388–399. *See also* Attitude(s).
Belongingness experiments, 290–292
Beta hypothesis in learning, 321
Bias of examiner, mental tests and, 185
Binet, Alfred, 159, 167, 171, 186–187
Biography, as case history, 97
  clinical, 377–379
  Pasteur's, 98–101
Birth(s), act of, 70–71
  limitation of, 164–165
  meaning of, to individual, 70–72
Blockage, of purpose, 241. *See also* Frustration.
Body, centrality of, in thinking, 43–47
  growth of, 47–51, 65–97
Book learning, 437
Brandenberg, G. C., 494*n*
Breeding, human, 192. *See also* Eugenics.
Brightness. *See* Intelligence.
Brown, J. F., 127*n*
Buehler, Karl, 460*n*–461*n*
Bulfinch, Thomas, 386
Bunting, J. R., 109
Bunyard, C. L., 512–513
Calibration of mental tests, 157–158
Camouflage, 322
Campbell, Helen, 135
Cantril, Hadley, 390*n*
Career(s). *See* Occupation(s).
Carnegie Foundation for the Advancement of Teaching, 497–500
Carter, H. D., 181*n*, 341
Cattell, J. McK., 106
Cause, need for devotion to, 254–255
Cause-and-effect, authority through, 12
Central State Teachers College, 4
Change, phenomenon of, 153–154
Character, 377–407
  education of, 405–407
  *See also* Personality.
Child, needs of, discovering, 13
  opinions of, value in school, 14
  universe of, 13–14
  visual perspective of, 13
Choice, of occupation, 94, 109–110
  situations of, 219–220
Chromosomes, sex and, 66–67, 246
Citizenship, education and, 503–515
Classification, 267–268
  of psychological topics, 107–108
Climate, social, 428
Closure, illustrated, 353–356
Coeducation, 483–484
Cognitive completeness, as value criterion, 19
College, instruction in, 481–502
  level, 93–94
Common sense, 198*n*
Community, educational effects on, 512–513
  opinion of, 509–511
  responsibility of, to individual, 15–16
  school and, 8, 511–514
Competence, fear and, 239–240
Competitive impulses, 211
Composition, language and, 456
Comprehension, inflection and, 80*n*
Compromise(s) as type of co-operation, 419
Compulsion, in group life, 418
Concept(s), of intelligence, 147–148
  modification of, 440–442
  number, 450–451
  Utopian, 354–355
  of whole man, 254–255
Conduct, human aspects of, 75
  purpose in, 197–201

Conduct (*cont'd*)
redirecting, 207–210
*See also* Behavior.
Conference methods, 490
Confirming reaction, in learning, 329
Conflict, of ideals, 388
among needs, 16–17
Congruency as value criterion, 19
Consequences, authority through probable, 12
as means of testing choices, 12
Conservatism in adulthood, 96
Consistency, theoretical, need for, 5
Constancy of IQ, 153–195
Constant error, 186
Continuity in development, 459
Control. *See* Discipline.
Conversion as psychological phenomenon, 459
Co-operation, 410–420
Corey, S. M., 112–115
Cornell, F. G., 510–511
Correlates, 279
Cortical change, intelligence and, 182
Counseling, in education, 379–380
limits of, 10–11, 12
Courses. *See* Subjects.
Courtesy as habit and ideal, 387
Courtis, S. A., 420*n*
Crawford, C. C., 463
Creativity, 347–375
form in, 363, 372
genius and, 349
intuition and, 359–361
poetry and, 370–371
Criteria, of mature behavior, 251–252
of value, 18–20
Culture, anxiety and, 237
criterion of maturity, 251
determinism of, 168–169
frustration and, 254–255
general, 125
human needs and, 254–255
individual assuming place in, 94–96
language and, 472–473
in mental tests, 167–168, 179–181, 192
pressures on adolescent, 91–92
stress on intelligence, 145–146
Curiosity, needs and, 15
Curriculum, issues of, 474–477
needs as basis for, 4
Cynicism as attitude, 388
Dallenbach, K. M., 440
Dashiell, J. F., 342–343
Dearborn, Walter F., 110
Dedifferentiation, 191
Dementia praecox, 128
Democracy, genealogy and, 192–193
Democratic atmospheres, 414–418
Deprivation, teaching endeavor and, 15
Desires, tabulated, 205
Determination, cultural, 168–169
Development, of attitudes, 391–395
continuity in, 459
of handwriting, 82–84
of ideals, 385–388
major features of, 75
mental, 85–87
motor, 78–79, 82–87
of opinions, 391–395
of organism, 65–66
of personality, 77–79, 81–97, 380–381, 383–384
pupil's, as educational aim, 7
self-, 3–4
sequence of, 87
in socialization, 77–88
of speech, 78–81
of writing, 82–84
*See also* Growth.
Dewey, John, 394
Differentiation, 48–51, 75
in arithmetic, 450–451
Discipline, authority as, 11–12
emotional, 239–243
formal, 310–311
ideals as, 323
punishment as, 324–382
social, 414–417
types of, of pupil, 11–12
Discriminanda, 269*n*
Discrimination, 54
Dislikes and likes, 112–114
Dodge, Raymond, 230*n*
Dogmatism, 105
Dominance, authority through, 11
Döring, W. O., 28*n*
Downing, E. R., 281
Drill, as learning factor, 322–324
Drives, 189–191, 200. *See also* Motivation.
Dualism, 44
Dullness. *See* Feeblemindedness; Intelligence.
Dunlap, Knight, 320–321

Ear-mindedness, 119
Eclecticism, 5–6
Economic value type, 27
Economy of time in teaching, 492
Ecstasy, 237
Education, of activity, 463–466
  body in, centrality of, 43–47
  of character, 405–407
  citizenship and, 503–515
  counseling in, 379–380
  effects of, on community, 512–513
  emotions used in, 235–237
  impression *vs.* expression in, 371
  needs as essential to, 16, 21
  physical, 46
  poverty and, 223
  primacy of learner in, 7–10
  progressive, purposes of, 6
  sensory, 52–55
  sex, 245–249
  social factors in, 141
  *See also* Educational psychology.
Educational psychology, administration related to, 507–511
  background for study of, 3
  content of, needed extension, 434
  first principles in, 4
  goals of, 142
  self-development, as aid to, 3–4
  value hierarchy in, 18
Educator(s). *See* Teacher(s).
Eduction principle, 278–279
Edwards, A. S., 180–181
Effectors, 55–57
Efficiency, happiness and, 233
  in learning, 285–344
  ratings of, 232–235
  in teaching, 344, 492
  values and, 33–34
Ego, enlarged, 254
  nearness, 125
  needs of, 254
  responses in adolescence, 91–93
Eichler, G. A., 423*n*
Elementary school, arithmetic in, 449–454
  language improvement in, 454–457
  period of, 87–90
  problems of, 437–458
  reading in, 437–447
  writing in, 447–449
Embryo, growth of, 67–70
Emotion(s), anger and fear as, 226, 241–243
  components of, 226
  controls of, 239–243
  criteria of maturity, 251
  educational use of, 235–237
  excitement and, value of, 236
  happiness as, 226–235
  improvement of, 225–256
  of infant, 250
  loyalties as, 253–255
  maturity of, 250–253
  promoting maturity of, 250–253
  pupil fears as, 237–241
  security and, 89, 237–241
  sexual, 244–250
Endeavor, deprivation and, 15
Ends-means relationship, 476
Enlarged ego, needs of, 254
Environment, dominance of, 160–163
  in euthenics and eugenics, 163–166
  heredity *vs.*, 67, 160–163
  intelligence and, 153–163, 167–168, 172–181, 188–193
  manageability of, 13
Equality in professional relations, 509
Equilibrium, 222
Erotic feeling, 247–248
Error(s), constant, 186
  halo, 185
  in learning, 320–321
Esthetic value type, 26–27
Ethical criterion, of maturity, 251
Ethics, Aristotelian, 235
Eugenics, 163–166, 192
  artificial insemination in, 165*n*–166*n*
  dysgenic influences, 165*n*
  euthenics *vs.*, 163–164
  feeblemindedness and, 164
  methods of, 164–165
Eulerian circles, in logic, 264–265
Eupathics, program of, 227
Euthenics, eugenics *vs.*, 163–164, 192
Evils, list of, 212
Evolution, mental, 85–87
  of needs, 16
  teachers on, 213, 398
Excitement, emotional, value of, 236
Exercise as learning factor, 320–324
Experts, as source of authority, 12
  in opinion formation, 392–393
Exploitation, 419
Expression, impression *vs.*, in education, 371
Expressive behavior, 55–57

Eyedness in reading, 110
Eye-mindedness, 199

Facts, ideas vs., 6
  organization of, 120–122
Faculty psychology, 310–311
Family, functions of, 249
Farmers, attitudes of, 411
Father, role of, in reproduction, 246–247
Fatigue, irritability and, 242
Fear, anger vs., 226
  authority through, 11
  competence and, 239–240
  controls of, 239–240
  orientational needs and, 240–241
  as typical emotion, 225
Fechner, G. T., 369
Feeblemindedness, in depressed areas, 179–181
  eugenics and, 164
  experiments on, 170–172, 177–178, 189
Feelings, analysis of, 226
Fertility, intelligence and, 164–165
Fetus, growth of, 67–70
Field, IQ and changes in, 158–159
  manipulation of, 133–134
Fletcher, J. M., 371*n*
Flory, C. D., 115–117
Fluidity, in topology, 127
Forgetting, analysis of, 124–127
Forlano, George, 301–302
Foster home, IQ and, 176–178
Frame of reference, 506–507
Francke, August, 28*n*
Freudism, 53*n*, 203*n*, 254
Frustration, anger and, 241–243
  cultures and, 254–255
  Lewin's studies, 190–191
  of teachers, 24
Functional viewpoint, 325

Galton, Francis, 54*n*
Genealogy, democracy and, 192–193
Genetic criterion of mature behavior, 251
Genius, 189, 215
  creativity and, 349
Gesell, Arnold, 72, 84*n*
Gibbon, Edward, 101
Gilbert, M. S., 68
Glossary, 527
Glueck, S. and E. T., 323
Goal(s), adult, 203–205
  behavior and, 130–134
  *See also* Drives; Motivation.
Goethe, 43
Good and evil, 212
  problem of, 7–8
Good, Carter, 493
Goodenough, Florence, 175–176
Gottschaldt, Kurt, 321–322
Government, needs of human and, 251–255
  systems, in social situations, 414–417
  teaching as, 11
Grade placement, 13
Grammar, 454–455
Group, individual and, 409
  pressure(s) of, 392, 418
  unity within, 508–509
Grouping, homogeneous, 485–487
  in learning, 288–290
Growth, 47–51, 65–97
  conditions of, 155–156
  continuity in, 459
  of embryo and fetus, 67–70
  intellectual, 115–177, 459
  patterns of, 65–66
  saltatory theory of, 459
  vocabulary, 111
  *See also* Development.
Guidance. *See* Counseling.

Habit(s), controls of, ideals as, 323
  courtesy as, 387
Halo error in mental testing, 185
Hamm, A. M., 332*n*
Handedness, 110
Handicapped individuals, 53–54
Handwriting, 447–449
  development of, 82–84
Happiness, components of, 228–230
  efficiency and, 233
  emotions and, 226–235
  ideals and, 235, 253–255
  intelligence and, 146
  loyalty as condition for, 255
  in occupations, 226
  personality traits and, 234
  rating of, 230–235
  sacrifice and, 253
  sympathy and, 234
  teacher and, 226
Hartson, L. D., 116*n*
Heaton, Kenneth L., 4*n*

Height, changes in, 14, 155
influences of, on adolescent, 14
Helmholtz, Hermann, 369
Heredity, environment *vs.*, 67, 160
in eugenics, 163–166
in intelligence, 153–160
Heritage, social, 347
Herring scale, 186
High school, period of, 92–93, 249
subjects of, 459–479
Hildreth, Gertrude, 177*n*
Hinton, N. H., 510–511
History taught "backward," 463
Hollingworth, L. S., 158, 160, 424–426
Holmes, F. B., 239*n*
Holt, 15
Home, school and, 88–90
Hookworm, IQ and, 180*n*–181*n*
Hygiene, mental, 128, 235
marriage and, 248–249
Hysteresis, 286

Id, needs of, 254
Ideal(s), conflict of, 388
as controls of habit, 323
courtesy as, 387
development of, 385–388
happiness and, 235, 253–255
intelligence and, 189
spelling as, 132–133
Ideas, facts *vs.*, 6
Identical elements, theory of, 314–316
Ideologies, current, 254–255
Imagination, 127–138
Imitation, 373
Impression, expression *vs.*, in education, 371
Improvement of character and personality, 141–143, 377–407
of creativity and originality, 347–373
curves of, 306–308
of emotions, 225–256
of intelligence, 145–194
of learning efficiency, 285–344
of motives, 197–222
of thinking and reasoning, 259–284
Inclusiveness as value criterion, 19
Income, intelligence and, 146
Inconsistency, 5
Indifference, feeling of, 226, 388
Individual, autonomy *vs.* authority, 10–12
community responsibility to, 15–16
culture, assuming place in, 94–96
group and, 409
values, as best judge of own, 10–11
Individuality, social factors and, 142
Individualization, of teaching, 481–482
experimental evidence, 487–490
Infant, behavior of, 74–81, 82–83, 250
Inference as higher mental process, 261–264
Inflection, comprehension and, 80*n*
Influences of majority, 391–392
Insight, illumination and, 368–369
illustrated, 294–298
intelligence and, 149–150
in motor skills, 303–305
relativity of, 358–359
Instruction. *See* Teaching.
Instructor(s). *See* Teacher(s).
Integration, in learning, 305–306
mechanisms of, 57–61
of personality, 380–381
Intellect, growth of, 115–117
subserviency of, to expert, 12
*See also* Intelligence.
Intelligence, abstractions and, 166–167
achievement and, 151, 168, 188
concept of, 147–152
conditions for raising, 171
controversial issues, 181–187
cortical change and, 182
cultural stress on, 145–146
democracy and, 192–193
in depressed areas, 179–181
deterioration of, 97
environment and, 153–160, 167–168, 172–181, 188–193
eugenics and, 163–166
experiments in raising, 169–178
fertility and, 164–165
happiness and, 146
heredity in, 153–160
ideals and, 189
income and, 146
insight and, 149–150
leadership and, 424–426
learning and, 182
logic instruction and, 169–170
measurement of, 152, 157–158, 166–194
modifying, 145–194
motivation and, 176–181, 188–193
occupation and, 177
as perception, 149–151

Intelligence (*cont'd*)
preschool studies of, 172–178
prestige of, 145–147
quotient. *See* Intelligence quotient.
rural, 165*n*
urban, 165*n*
vocabulary and, 151, 169–170
Intelligence quotient, adoption, effects of, 177
bias of examiner and, 185
constancy of, 153–195
dogmatic claims, 156–160
environment and, 158–163, 167–168, 172–181, 188–193
feeblemindedness and, 170–171
field changes and, 158–159
foster home and, 176–178
hookworm and, 180*n*–181*n*
increase and decrease of, 178
mountaineer children and, 179–181
orphanage affecting, 178
practice affecting, 184
rapport and, 185
regression phenomenon in, 184
sampling problem and, 184, 186
semantics instruction and, 169–170
socialization and, 175
Intensity of values, 20, 29*n*
Interdependence, phenomena of, 59–61
Interest(s), expansion of, 402–403
personality enrichment through, 399–405
schematized, 126–127
values and, 26*n*
Intersensory effects, 360
Intuition, creative process and, 359–361
perception and, 150
Investigation(s), before-and-after, as technique of, 299
belongingness, 290–292
on feeblemindedness, 170–172, 177–178, 189
on intelligence, modification of, 169–178, 181*n*, 184, 186, 189
on learning, procedures in, 298–302
on motivation, 189–191
nature-nurture, 169–178
in nursery school, 172–176
in personality, 230–235
in play situations, 190–191
on spelling, 117–120
on teachers, adequacy of, 497–500
on transposition, 318–319
on twins, 181*n*
IQ. *See* Intelligence quotient.
Irreality, 127–128
Irrevocability as criterion of value, 19
Irritability, fatigue and, 242
*See also* Anger.

James, William, 130–131, 316, 319*n*
Jensen, M. B., 328*n*
Jersild, A. T., 239–240
Johns, W. B., 111
Jones, H. E., 341
Jones, L., 180–181
Judd, C. H., 261*n*, 275*n*, 281*n*, 282*n*, 317–318, 319*n*
Judgment(s), of values, 10–12, 19–20
*See also* Ratings, Tests.
Justice, growth of sense of, 385–386

Kantor, J. R., 455
Kao, D. L., 307–308
Karn, H. W., 111*n*
Katona, George, 287–290
Kekulé, Friedrich, 369
Kephart, N. C., 170–171, 173
Key, C. B., 180
Kirk, S. A., 110
Knowledge, personalization of, 403
of results, as learning aid, 301
self-, 3
Koffka, Kurt, 123*n*
Köhler, Wolfgang, 374*n*
Koopman, G. Robert, 4*n*
Korzybski, Alfred, 169
Kreezer, George, 440
Kuhlmann scale, 186

Laboratory viewpoint, 300–301
Laissez-faire as social organization, 414–418
Language(s), composition and, 456
culture and, 472–473
development of, 76–77, 78–81, 86–87, 111
foreign, 472–474
grammar of, 454–455
instruction in, 472–474
intelligence and, 151, 169–170
sentence sense of, 454

Language(s) (*cont'd*)
thought and, 277–278
usage of, 454–456
Lansbury, George, 423
Lashley, K. S., 313–314
Laymen, schools and, 509–511
Leadership, 420
intelligence and, 424–426
training in, 422–428
values and, 427
Learned, W. S., 498
Learner. *See* Student.
Learning, 285–345
adaptation and, 285
adult, 504–507
aids in, 301
beliefs as products of, 388–399
belongingness in, 290–292
beta hypothesis in, 321
book, 437
components of, 342–343
confirming reaction in, 329
curves of, 306–308
drill in, 322–324
efficiency in, 285–344
errors in, 320–321
grouping in, 288–290
insight in, 294–298
integration in, 305–306
intelligence and, 182
life and, 287
materials of, pleasure value of, 332–342
meaning in, 293–294
mental set in, 325–326
modifiability and, 285
motivation for, 324–342, 505–506
motor, 302–308
overlearning, 307
part, 308–309
plateau in, 306–308
pleasantness-unpleasantness of, 341–342
procedures in studies of, 299
punishments and, 324–382
recitation as aid to, 301
repetition in, 320–324
research limitations of, 298–302
results of, knowledge of, 301
rewards in, 324–332
right and wrong, 330–331
satisfactions in, 332–342
as structural reorganization, 305
swimming as, 304–306
time factor in, 490–492
trial-and-error, 294–298
whole and part methods of, 4, 308
will in, 326–327
Lecky, Prescott, 132
Lewin, Kurt, 124, 189–191, 217–221, 414–417
Life, cycle of, 65–103, 155
embryonic, 67–70
learning and, 287
Likes and dislikes, 112–114
Lippitt, Ronald, 414–417
Logic, Eulerian circles in, 264–265
instruction in, intelligence and, 169–170
Logical, memorizing, rote memory *vs.*, 292–293
relations, maturation of, 439–442
Longevity, increased, 155
Lorge, Irving, 158
Loyalty(ies), cultivation of, 253–255

Majority, influences of, 391–392
as value criterion, 18
Maladjustment, in adolescence, 91–93
in maturity, 95–96
school and, 89
Man, harmonious, 255
psychological, 255
[illegible] of, 254–255
Manuscript writing, 447–448
Map problems, 461
Marple, C. H., 392
Marriage, mental hygiene and, 248–249
preparation for, 249
teachers and, 398
Masturbation, 248
Maturation, of concepts, 440–442. *See also* Growth.
Maturity, early and later, 94–96
emotional, 250–253
maladjustment in, 95–96
sexual, 90–92
values in, 95–96
Maurer, K. M., 175–176
McCallister, J. M., 282
McConnell, T. R., 116*n*
Meaning, in learning, 293–294
Measurement, of happiness, 230–231
of intelligence, 152, 157–158, 166–194
of values, 18–20, 31, 32, 235
*See also* Mental tests; Tests.

Memorizing, of numbers, 452–454
primacy and recency in, 454*n*
rote, logical *vs.*, 292–293
Mental evolution, 85–87
Mental growth, saltatory theory of, 459
Mental health, 235, 245–250
Mental hygiene, 128, 235
marriage and, 248–249
Mental processes, higher, 261
Mental set in learning, 325–326
Mental tests, bias of examiner and, 185
calibration of, 157–158
culture in, 167–168, 179–181, 192
halo errors in, 185
norms in, 186
practice, effects on, 184
regression phenomenon in, 184
reliability of, 185–186
social factors in, 167–168, 171*n*, 172–181, 192
standardization of, 185–186
use of, in practice, 152
validity of, 186–187
Merrill-Palmer scale, 187
Merrill, R. R., 423*n*
Method(s), conference as, 490
of investigation, 299
in teaching, 435, 448–449
Miles, C. C., 482
Milton, 34
Minority, instability of, 392
Mistakes, right to make, 11
Modifiability, learning and, 285
Monism, 45–47
Morale, 227
among educators, 508
Moreno, J. L., 208*n*, 243
Morgan, J. E., 124*n*
Mort, P. R., 510–511
Motivation, 201–202
in adult learning, 505–506
awareness and, 162–163
intelligence and, 176–181, 188–193
learning and, 324–342, 505–506
Lewin's views, 189–191
as seen in Pasteur, 98–101
in senescence, 97
tension and, 199–200
test rapport and, 185
in topology, 131–134
Motor, development, 78–79, 82–87
learning, 302–308
Mountaineer children, 179–181
Mowrer, O. H., 412–413
Muenzinger, K. F., 329
Murry, J. M., 375
Muscles as response organs, 55–57
Myerson, A., 227

National Education Association, 418–420
Naturalism, 44
Nature-nurture, controversial issues, 181–187
environmental dominance, 160–163
evidence, indirect, 179–181
experiments, 169–178
*See also* Eugenics; Intelligence; Mental tests.
Need(s), adient behavior as product of, 15
as awareness, 16
for a cause, 254–255
conflict among, 16–17
creation of, by school, 16
culture and, 254–255
curiosity and, 15
as curriculum basis, 4
deprivation as basis of, 15–16
discovering of child's, 13
as educational control, 7–22
evolution of, 20
Freudian classification of, 254
of orientation, 240–241
of pupils, 9–10, 13, 15–17
range of, 15
social systems and, 254–255
source of, 20
tissue, 15
want *vs.*, 16
Neonate, characteristics of, 69, 71–76
Neoscholastic psychology, 45
Nervous system, 58–59
Noll, V. H., 468
Norms, emotional, 250–251
in mental tests, 186
Number, combinations, 324
concepts, 450–451
drill, 324
memory value of, 452–454
symbolism, 276
Nursery school, studies in, 172–176, 187

Occupation(s), choice of, 94, 109–110
happiness in, 226
intelligence and, 177
prestige of, 36–40

Olander, H. T., 324
Olson, Willard, 174–175
Operational outlook, 106
Opinion(s), of child, value in school, 14
of community, 509–511
formation of, 391–395
of teachers, student desire for, 4
*See also* Attitudes.
Opposites, relation of, 440
Orata, P. T., 319*n*
Organism, development of, 65–66
unity of, 58–62
values, as essential for, 8
Organismic outlook, 46–47
Organization of facts, 120–122
Orientation, behavior and, 460–462
needs for, fear and, 240–241
Originality, 347–375. *See also* Creativity.
Orphanage, IQ effected in, 178
Otis, M., 170

Pacifism, 154, 166, 252
Palmer method, 448–449
Parenthood, selection for, 164–165
Part, learning, 308–309
situation, in loss of temper, 4–5
Parts, of speech, 275
Pasteur, Louis, sample biography, 97–101
Paterson, Donald, 180*n*
Patrick, C., 369–370
Pattern(s), of growth, 65–66
Pavlov, Ivan, 261
Pearson, Karl, 153
Penmanship, 447–449
Pennsylvania Inquiry, 497–500
Perception, intelligent behavior as, 149–151
of word, 119–120
Performance, poetic, 361–364
style in, 306
Permanence as value criterion, 19
Personal problems, list of, 401
Personality, character *vs.*, 381
culture and, 254–255
development of, 77–79, 81–97, 380–381, 383–384
happiness and traits of, 234
improvement, as core problem of, 141–143
influences upon, 11–12
integration of, 380–381
interaction of, 23
interests, enrichment through, 399–405
rating study, 230–235
role playing in, 383–384
school and, 88–90
Spranger's types of, 25–34
structure of, 125–126
temperament and, 381
theme-song conception of, 381–385
uniqueness in, 382
as value pattern, 25
Personalization of knowledge, 403
Perspective, visual, of child, 13
Pestalozzi, J. H., 28
Physical education, 46
Plateau in learning, 306–308
Play, Lewin's studies in, 190–191
Pleasantness-unpleasantness in learning, 341–342
Poetic performance, 361–364
Poetry, process of producing, 370–371
Polarity in thinking, 268–269
Political psychology, 516
value type, 27–28
Popularity of teachers, 112–114
Poverty as an educational problem, 223
Power, authority through, 11
in teaching, 23
tests of, 506
Powys, J. C., 227
Practicality, 270
Practice, curves of, 304–305
effect on mental tests, 184
theory and, 318
Prenatal stage, 66–70
Preschool, behavior during, 81–87
studies, on intelligence, 172–178
tests, validity of, 187
Prescott, D. A., 251–252
Prestige, of intelligence, 145–147
of occupations, 36–39
suggestion and, 393–394
Primacy, of body, 43–47
of learner, in education, 7–10
in memory, 454*n*
Problem solving, 128–131, 352–354
Psychoanalysis, 53*n*
of human needs, 254–255
Psychologizing, 197*n*
Psychology, abstracts in, 107–109
centrality of body in, 43–47
of conversion, 459

Psychology (*cont'd*)
educational. *See* Educational psychology.
faculty, 310–311
neoscholastic, 45
political, 516
of the psychologist, 105–107
topics in, classification of, 107–108
Puberty, characteristics of, 90–92
Punishment in learning, 324–382
Pupil(s). *See* Student(s).
Purpose, blockage of, 241
in conduct, 197–201
fitness of behavior to, 149

Race factor in education, 484–485
Rapport in test situations, 185
Rating(s), of efficiency, 232–235
of happiness, 230–235
of sympathy, 232–235
of teachers, 493–496
*See also* Scales.
Reaction(s). *See* Response(s).
Readiness, 390
Reading, 437–447
eyedness in, 110
readiness for, 438
remedial, 444–447
wholeness in, 442–444
Realism, 269–271
Reality dimensions, 127–128
Reasoning, devices for, 264
improvement of, 259–284
*See also* Thinking.
Recency in memorizing, 454*n*
Recitation as learning aid, 301
Regression phenomenon in IQ studies, 184
Relations, eduction of, 279
Relativism in science, 155–156
Reliability in mental tests, 185–186
Religion, adolescence and, 92*n*
Remmers, H. H., 494*n*
Repetition in learning, 320–324
Reproduction, chromosomes in, 67
male role in, 246–247
Research, in learning, limitations of, 298–302. *See also* Investigations.
Respect, authority through, 11
Response(s), confirming, in learning, 329
muscles as organs of, 55–57
novel, 356
Results, knowledge of, as learning aid, 301
Rewards in learning, 324–332
Risden, G. A., 172
Rogers, A. I., 115*n*
Roget, Peter, 268
Role-playing in personality formation, 383–384
Ruediger, W. C., 316–317
Rugg, Harold, 350

Sacrifice, satisfaction in, 253
Saltatory theory of mental growth, 459
Sampling, of behavior, 85, 87
in intelligence studies, 184, 186
Satisfaction(s), in learning, 332–342
in sacrifice, 253
Scale(s), of personality traits, 230–235
of teachers' qualifications, 493–496
of values, 18–20, 31, 32, 235
*See also* Mental tests, Tests.
Scapegoat mechanism, 416
Schlosberg, H., 109
School, child's opinions in, value of, 14
community and, 8, 511–514
elementary, period of, 87–90, 437–457
emotions and, 225–256
home and, 88–90
laymen and, 509–511
maladjustment and, 89
needs created by, 16
nursery, studies in, 172–176, 187
personality improvement and, 141–143
purpose of, 7
socialization and, 88–90
subjects of, 437–457, 459–479
Schooley, Mary, 440*n*
Schuchardt, C. R., 281
Science, difficulty of concepts of, 469–471
general, 467
relativism in, 155–156
teaching of, 466–471
Security, emotions and, 89, 237–241
Self, 125–126
-development, educational psychology as aid to, 3–4
-direction, 142–143
-government, 412–414
-knowledge, 3
Semantics, instruction in, and IQ, 169–170

Senescence, characteristics of, 96–97
intellectual deterioration in, 97
motivation impairments in, 97
waiting attitude of, 96
Sensitivity, 52–55
Sensory education, 52–55
Sentence sense, 81*n*, 454
Sequence, topical, in science, 469–471
Serendipity, 151
Sex, behavior, 244–250
determination of, 67
development, 90–92
differences, 30, 90, 94, 482–483
education, 245–249
Sherman, M., 180, 251
Sherrington, Charles, 60
Shock, N. W., 341
Similarity, 266–267
function of, 365–366
in transfer, 314–319
Situation(s), authority through, 12
choice, 219–220
part, in loss of temper, 4–5
play, Lewin's studies, 190–191
rapport, in mental testing, 185
social, 414–417
Skeels, H. M., 177
Skepticism, 105
Skill(s), all-or-none character of, 304
curves of improvement of, 306–308
examples of, 303, 304–305, 308
insight in, 303–305
sensory aspects of, 302–303, 306
stages of acquisition, schema of, 305
Social, atmospheres, 414–418
attitudes, modification of, 142
behavior, 409–430
climate, 428
compulsion in group life, 418
criterion of mature behavior, 251
education, factors in, 141
fear, factors in, 237–241
heritage, 347
individuality, factors in, 142
interaction, 23–24
mental testing, factors in, 167–168, 171*n*, 172–181, 192
-mindedness, 421
pressures, 392
prestige, of intelligence, 145–147
psychology, relations to educational, 503
studies, 459–466
systems and human needs, 254–25!
value type, 28
Socialization, developmental, 77–78
in raising IQ, 175
school and, 88–90
Spearman, Charles, 278–280
Speech, 456–457
development of, 78–81
parts of, 275
Speed, function of, 506
Speer, G. S., 177*n*
Spelling, as ideal, 132–133
researches on, 117–120
Spontaneity, 221
Spranger, Eduard, 25–30, 40, 235
Squire, C. R., 316–317
Stage. *See* Growth; Therapeutic sta
Stammering, 456
Status, authority through, 11
of occupations, 36–40
of teaching, 36–40
Stephens, D. T., 471*n*
Stimulation. *See* Motivation.
Stimulus, range of, 54
Stoddard, G. D., 85*n*, 159*n*, 193*n*
Strauss, Samuel, 281
Student(s), development of, 7
fears of, 237–241
happiness of, 230–235
needs of, 9–10, 13, 15–17
primacy of, meaning of, 8–9
teacher opinions, desire for, 4
-teacher relations, 23–24, 128
Studies. *See* Investigations.
Stuttering, 456
Style in performance, 306
Subject matter, of elementary sch 437–457
of high school, 459–479
influence of, on values, 31–32
preferences in, 112–114
requirements in, 404
social, 459–466
Subwholes in learning, 309
Suggestion, attitudes and, 393–394
Superego, needs of, 254
Supervision, 515
Survival as value standard, 20
Swimming, analysis of, 304–306
Symbols, numbers as, 276
in thinking, 273–275
Sympathy, happiness and, 234
ratings of, 232–235

System(s), as applied to thinking, 5
social, 251–255, 414–417
theoretical, 4–6, 45–47
*See also* Viewpoint.

Talking. *See* Speech.
Tamerlane, 423
Teacher(s), adequacy of, 497–500
as artist, 350
attitudes of, 213, 395–399
authority, use of, 11–12
emotions used by, 235–237
on evolution, 213, 398
frustration of, 24
happiness and, 226
ideal, profile of, 34
married, 398
morale among, 508
needs, attention to, 9–10, 24
opinions, student desire for, 4
popularity of, 112–114
prestige of, 36–40
prospective, ability of, 497–499
-pupil relations, 23–24, 128
rating scales for, 493–496
self-development of, 3–4
in training, 496–500
values of, 23–41
Teaching, arithmetic, 449–454
authority used in, 11–12
characterized, 43
college, 481–502
efficiency in, 344, 492
as government, 11
guidance in, 379
history, 463
individualization of, 481–482, 487–490
languages, 472–474
logic, intelligence and, 169–170
methods in, 435
needs of pupil in, 9–10
power in, 23
science, 466–471
semantics, intelligence and, 169–170
status of, 36–40
values, as process of communication of, 29–34
whole situation in, 4
Technique, importance of, 299
Teleology, 221*n*
Temper, loss of, 4–5
Temperament, 381
Tension, motivation and, 199–200
Terman, Lewis, 162, 183–187, 492
Terminology, 6
Tests, or choices, 12
comparability among, 186–187
mental, 152, 157–158, 186–194
power, 526
*See also* Mental tests, Scales.
Theme-song conception of personality 381–385
Theory, practice and, 318. *See also* Viewpoint.
Therapeutic stage, 223*n*, 243
Thinking, 259–284
body in, centrality of, 43–47
incubation phase, 368
language and, 277–278
polarity in, 268–269
scientific, 281
structures in, 271–272
symbols in, 273–277
system in, 5
Thomas, Norman, 394*n*
Thomism, 45
Thorndike, E. L., 106*n*, 204–227, 209–211, 290–292, 314, 315, 310*n*, 329, 433–434
Thought. *See* Thinking.
Thumb sucking, 223*n*
Thwarting. *See* Frustration.
Tissue needs, 15
Titchener, Edward, 106*n*
Tolman, Edward, 255
Topology, 123–136
fluidity in, 127
motivation in, 131–134
Trachtenberg, D., 355*n*
Training, teachers in, 496–500
Trainor, V. C., 169–170
Traits, 387
happiness and, 234
of personality, 230–235
teacher, of ideal, 34
Transcendental outlook, 44–45
Transfer, bilateral, 313
generalization theory of, 316–318
identical elements theory of, 314–316
interpreted, 310–319
proportionate, 315
similarities and, 314–319
Transposition experiments, 318–319

Trauma, 394
  birth, 70–71
Trial-and-error behavior, 294–298
Twain, Mark, 105
Twins, IQ studies on, 181*n*
Tyler, R. W., 261–263

Uniqueness, in personality, 382
  as value criterion, 19
Unity, within groups, 508–509
  of organism, 58–62
University of Iowa, 173–176, 178, 183
Uterine environment, 69
Utopian conceptions, uses of, 354–355

Valence, 131
Validity of mental tests, 186–187
Vallery-Radot, René, 101*n*
Value(s), in adolescence, 92–93
  Allport-Vernon Scale of, 31, 32, 235
  of Benjamin Franklin, 142
  criteria of, 18–20
  efficiency and, 33–34
  extensity of, 29*n*
  formation of, 142
  hierarchy of, in educational psychology, 18
  of home and school, 89
  intelligence as, 145–147
  intensity of, 20, 29*n*
  interests and, 26*n*
  judge of, 10–11
  leadership and, 427
  in maturity, 95–96
  measuring relative, 18–20, 31, 32, 235
  of Pasteur, 100–101
  personality as pattern of, 25
  in research, 169
  in senescence, 96–97
  Spranger's types of, 25–34, 235
  subject matter, influence on, 31–32
  of teachers, 23–41
  in youth, 93–94
Van Doren, Carl, 142*n*
Vector, 129
Verification, process of, 369
Vernon, Philip, 29*n*
Viewpoint, eclectic, 5–6
  functional, 325
  laboratory, 300–301
  operational, 106
  organismic, 46–47
  philosophical, 45–47
  theoretical, necessity for, 5–6
  transcendental, 44–45
Visual perspective of child, 13
Vocabulary, growth of, 111
  size of, intelligence and, 151, 169–170
  *See also* Language.
Vocation(s). *See* Occupation(s).

Walker, W. L., 463
Walking, child's, 78–79
  motor skill as example of, 305
Wallas, Graham, 366–369
Want(s). *See* Need(s).
War, Pasteur's views on, 100–101. *See also* Pacifism.
Ward, Artemus, 118
Watson, D. L., 374*n*
Watson, Walter, 507*n*
Wellman, B. L., 85*n*, 173–174
Wheeler, L. R., 179–180
Whipple, Guy M., 152*n*
White, R. K., 414–417
Whitehead, A. N., 19
Whole, in learning, 4, 308–309
  man, satisfying of, 254–255
  in reading, 442–444
  in teaching, 4
Will, interpreted, 216
  to learn, 326–327
Wisdom, superior, authority through, 12
Woodworth, R. W., 214, 315, 358–359
Word, perception of, 119–120
  sentence, 81*n*
Workmanship, 214
Wright, M. B., 115*n*
Writing, development of, 82–84
  hand-, 447–449
  manuscript, 447–448
Youth, 93–94, 515
  loyalties and, 253
  values in, 93–94
  *See also* Adolescence; Maturity.

Zimmerman, C. C., 410–411